Henry C. Pearson, F. R. G. S., Founder
Edward Lyman Bill, Publisher
B. Brittain Wilson, Business Manager

INDIA RUBBER WORLD

William M. Morse, Editor
Webster Norris, Associate Editor
D. C. McRoberts, Assistant Editor

Volume 92 | June 1, 1935 | Number 3

Contents

Articles

		Pages
Compounding Ingredients		27
Modern Rubber Research		31
Future Problems in Rubber	*E. A. Hauser*	32
Methods Engineering in Footwear Manufacture	*David Phillips*	33
The Foreman's Job	*G. F. Buxton*	35
Retreading Patents	*Joseph Rossman*	37
Contributors to Rubber Compounding Progress		39
Annals of Rubber		42
Distributers' Tire Stocks in the United States, April 1, 1935		43
Hard Rubber (Ebonite)	*A. R. Kemp and F. S. Malm*	45
Para-Graphs		47

Departments

	Pages
Editorials	48
What the Rubber Chemists Are Doing	49
New Machines and Appliances	51
Goods and Specialties	53
Rubber Bibliography	54
Book Review	54
New Publications	54
Rubber Industry in America	55
Obituary	59
Rubber Industry in Europe	61
Far East	63
Patents	65
Machinery, Process, Chemical, General	
Trade Marks	68
Financial	80
Rubber Trade Inquiries	82
Foreign Trade Information	84
MARKET REVIEWS	
Crude Rubber	71
Rubber Scrap	73
Reclaimed Rubber	74
Compounding Ingredients	75
Cotton and Fabrics	78

Departments

	Pages
STATISTICS	
London Stocks	84
and Liverpool	74
Malaya, British, Exports and Imports	73
United States	
and World, of Rubber Imports, Exports, Consumption, and Stocks	74
for February, 1935	84
Imports by Customs Districts	84
for 1935 by Months	82
Latex	82
Production, Rubber Goods	84
Tire	82
Reclaimed Rubber	74
World and United States, of Rubber Imports, Exports, Consumption, and Stocks	74
Net Imports of Crude Rubber	82
Shipments of Crude Rubber from Producing Countries	82
CLASSIFIED ADVERTISEMENTS	81
ADVERTISERS' INDEX	94

Published monthly by Bill Brothers Publishing Corp., 420 Lexington Ave., New York, N. Y. Cable Address: Elbill, New York. Subscription $3.00 per year postpaid in the United States and Mexico; $4.10 per year postpaid to Canada; $4.00 per year postpaid to all other countries.

NRA MEMBER U.S. WE DO OUR PART

Other Bill publications are: *Drapery Profits, Premium Practice, Rug Profits, Sales Management, Soda Fountain,* and *Tires.*

Contents Copyright, 1935

ARE YOU LOADING?

Thermax is again to the fore, selling better than any time since '29.

To meet competitive conditions, for good processing and quality—the present price of rubber makes the immediate use of Thermax worth while.

Will you try it now?

R. T. VANDERBILT CO.

230 PARK AVENUE

New York, N. Y.

INDIA RUBBER WORLD

Published at 420 Lexington Avenue, New York, N. Y.

Volume 92 | **New York, June 1, 1935** | **Number 3**

Compounding Ingredients[1]

Compositions—Properties—Functions

SOFTENERS frequently exert specific functions in a rubber compound other than to plasticate the mixing; consequently care should be taken in choosing them for use singly or in combination to produce desired results in processing and curing stocks for definite service. In selecting a softener for a given problem in rubber compounding reference should be had to the manufacturers' claims for each softener. For example, some have only a lubricating effect. These serve to reduce the power required in milling. In calendering and tubing they give smooth surface to the stock and facilitate volume production. Other softeners favorably affect the tensile properties of the rubber compound, still others improve the curing rate of crude rubber, add tackiness, assist the aging quality, or by dispelling the surface tension of intensely fine pigments, allow them to be absorbed freely in the mixing and produce a stock of exceptional serviceability.

Softeners

B.R.C. No. 555

CHEMICAL COMPOSITION. Refined tar product.
SELLER. The Barrett Co.
APPLICATIONS. Mechanicals.
PHYSICAL STATE. Free flowing liquid.
PROPERTIES. Sp. gr., 1.07 to 1.09 at 15.5° C. (60° F.). Sp. viscosity 2.0 to 4.0 at 40° C. (104° F.). Water 1% maximum; free carbon 2% maximum. Distillation to 170° C. (338° F.) 3% maximum; to 235° C. (455° F.) 10 to 25% maximum; to 300° C. (572° F.) 55% maximum. Stable. Non-toxic. Odor mild. Readily absorbed by rubber.
PURPOSE AND FUNCTION. Softener for crude rubber mixings and reclaiming of rubber scrap.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. No effect on rate of cure.
PATENTS. Not disclosed.

B.R.H. No. 2

CHEMICAL COMPOSITION. Asphaltic product.
SELLER. The Barrett Co.
APPLICATIONS. Friction tape, mechanicals, heels, soles, airbags, etc.
PHYSICAL STATE. Dark-colored viscous liquid.
PROPERTIES. Sp. gr., 1.00 maximum at 15.5° C. (60° F.). Viscosity (Engler) 100 cc. at 150° C. (302° F.), 80 to 115 seconds. Flash point (open cup), 204° C. (400° F.). Soluble in carbon tetrachloride. Evaporation loss (5 hours) at 204° C. (400° F.) 3% maximum.
PURPOSE AND FUNCTION. Softener and tack producer. Improves calendering and extrusion. Ages well.
METHOD OF USE. Add directly to the rubber.
VULCANIZATION. Does not alter the rate of cure.
PATENTS. Not disclosed.

B.R.T. No. 3

CHEMICAL COMPOSITION. Refined coal tar.
SELLER. The Barrett Co.
APPLICATIONS. Saturant for brake lining and a good softener for rubber reclaiming.
PHYSICAL STATE. Heavy dark viscous liquid.
PROPERTIES. Sp. gr., 1.15 to 1.19 at 15.5° C. (60° F.). Viscosity (Engler), 100 cc. at 40° C. (104° F.) 300-400 seconds. Water 3% maximum. Free carbon 4 to 10%. Stable. Non-toxic.
PURPOSE AND FUNCTION. Saturant for brake linings.
METHODS OF USE. Saturating bath to be held at suitable temperature not exceeding 96° C. (205° F.). The saturated lining should be passed immediately through steam-heated wringing rolls and continue to travel through an oven where it is baked to the required hardness through evaporation of lighter oils. B.R.T. No. 3 may be used in conjunction with asphalt, gilsonite, etc.
VULCANIZATION. No effect on rate of cure.
PATENTS. Not disclosed.

B.R.T. No. 7

CHEMICAL COMPOSITION. Refined coal tar specialty.
SELLER. The Barrett Co.
APPLICATIONS. Black footwear, auto topping.
PHYSICAL STATE. Heavy viscous liquid.
PROPERTIES. Sp. gr., 1.20 to 1.25 at 25° C. (77° F.). Viscosity (Engler) 100 cc. at 100° C. (212° F.), 120 to 200 seconds. Distillation to 170° C. (338° F.) none. Distillation to 300° C. (572° F.) 25% maximum. Stable. Odor mild. Disperses readily in rubber.
PURPOSE AND FUNCTION. Rubber softener. Retards deterioration and cracking.

[1] Continued from INDIA RUBBER WORLD, May 1, 1935, pp. 29-32.

METHODS OF USE. Add directly to rubber.
VULCANIZATION. No effect on rate of cure.
PATENTS. Not disclosed.

B.R.V.

CHEMICAL COMPOSITION. Selected heavy coal tar distillate.
SELLER. The Barrett Co.
APPLICATIONS. Pneumatic and solid bus tires and inner tubes, steam hose, mechanicals, friction stocks, airbags and tire repair stocks, reclaims.
PHYSICAL STATE. Liquid at ordinary temperatures.
PROPERTIES. Sp. gr., 1.135 minimum at 38° C. (100.4° F.). Sp. viscosity 100 cc. at 50° C. (122° F.) 7 to 10. Water 0.5% maximum. Benzol insoluble 0.3% minimum. Distillation to 300° C. (572° F.), 7% maximum; to 315° C. (599° F.), 4 to 12% maximum; to 355° C. (691° F.), 20% maximum. Fluid at 25° C. (77° F.). Non-saponifiable. Stable. Non-toxic. Readily absorbed by rubber.
PURPOSE AND FUNCTION. Softening agent, resistant to abnormally high temperatures, checking and deterioration through aging. Excellent reclaiming oil.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. No effect on rate of cure.
PATENTS. Not disclosed.

Bardex

CHEMICAL COMPOSITION. Coal tar product.
SELLER. The Barrett Co.
APPLICATIONS. Tire carcass and belting stocks, heels and mechanicals, and in reclaiming rubber.
PHYSICAL STATE. Free flowing oily liquid.
PROPERTIES. Sp. gr., 1.07 to 1.11 at 25° C. Sp. viscosity 100 cc. at 40° C., 30 to 35. Stable. Non-toxic. Readily absorbed by rubber.
PURPOSE AND FUNCTION. Imparts good tack to tire and belting stocks, reduces scorching, and improves aging quality.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. Slightly retards rate of cure.
PATENTS. Not disclosed.

Bardol

CHEMICAL COMPOSITION. Coal tar derivative.
SELLER. The Barrett Co.
APPLICATIONS. Tire treads, mechanicals, frictions, and molded goods.
PHYSICAL STATE. Dark brown liquid, fluid at 40° F.
PROPERTIES. Sp. gr., 1.08 to 1.12, at 60° F. Sp. viscosity at 65.5° C. (150° F.) 1.37 maximum. Flash point above 100° C. (212° F.). Moisture 1% maximum; free carbon 0.5% maximum. Distillation, percentage by weight, up to 210° C. (410° F.), 1% maximum; 235° C. (455° F.), 10% maximum; 300° C. (572° F.), 30 to 60% maximum. Stable. Non-toxic. Odor characteristic. Rapidly absorbed by rubber.
PURPOSE AND FUNCTION. Efficient plasticizer. Excellent dispersing agent. Imparts good aging quality.
METHODS OF USE. Add from 2 to 5% directly to the rubber.
VULCANIZATION. Slightly accelerating and serves to counteract the retarding effect of carbon blacks and clays.
PATENTS. Not disclosed.

Burgundy Pitch

CHEMICAL COMPOSITION. Rosin and nineral oil.
SELLER. Wishnick-Tumpeer, Inc.
APPLICATIONS. Friction tape, mechanical goods frictions and skim coats.
PHYSICAL STATE. Soft solid.
PROPERTIES. Sp. gr., 1.04. M. p., 100° C. (212° F.). Stable. Non-toxic. Amber color. Odor of pine.
PURPOSE AND FUNCTION. Facilitates compounding by softening rubber and dispersing dry ingredients. Confers tackiness to the uncured mixing.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. No effect on rate of cure.
PATENTS. Not disclosed.

Coblax 55

CHEMICAL COMPOSITION. Mineral black oil.
SELLER. Standard Oil companies of New Jersey, Louisiana, and Pennsylvania; Colonial Beacon Oil Co.; and Penola, Inc.
APPLICATIONS. Reclaim, tire tape, footwear, and molded mechanicals.
PHYSICAL STATE. Liquid.
PROPERTIES. Sp. gr., 0.9182. Flash (open cup), 185° C. (365° F.). Pours at –12.2° C. (+10° F.). Saybolt viscosity at 37.8° C. (100° F.), 430 seconds. Viscosity at 98.8° C. (210° F.), 58 seconds. Precipitation number, 1.10 (A.S.T.M.). Stable. Non-toxic. Disperses readily in rubber.
PURPOSE AND FUNCTION. Permanent softener and tack producer.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. Little effect on rate of cure.
PATENTS. Not disclosed.

Coblax 66

CHEMICAL COMPOSITION. Mineral black oil.
SELLER. Standard Oil companies of New Jersey, Louisiana, and Pennsylvania; Colonial Beacon Oil Co.; and Penola, Inc.
APPLICATIONS. Reclaim, tire tape, footwear, and molded mechanicals.
PHYSICAL STATE. Liquid.
PROPERTIES. Sp. gr., 0.9273. Flash (open cup), 193° C. (380° F.). Pours at —18° C. (0° F.). Saybolt viscosity at 37.8° C. (100° F.), 565 seconds. Viscosity at 98.8° C. (210° F.), 66 seconds. Precipitation number, 4.1 (A.S.T.M.) Stable. Non-toxic. Disperses readily in rubber.
PURPOSE AND FUNCTION. Permanent softener and tack producer.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. Minimum effect on rate of cure.
PATENTS. Not disclosed.

Coblax 80

CHEMICAL COMPOSITION. Mineral black oil.
SELLER. Standard Oil companies of New Jersey, Louisiana, and Pennsylvania; Colonial Beacon Oil Co.; and Penola, Inc.
APPLICATIONS. Reclaim, tire tape, footwear, and molded mechanicals.
PHYSICAL STATE. Semi-liquid.
PROPERTIES. Sp. gr., 0.8967. Flash (open cup), 254° C. (490° F.). Pours at 18.3° C. (65° F.). Saybolt viscosity at 37.8° C. (100° F.), 1,030 seconds. Viscosity at 98.8° C. (210° F.), 77.8 seconds. Stable. Non-toxic. Disperses readily in rubber.
PURPOSE AND FUNCTION. Permanent softener and tack producer.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. Minimum effect on rate of cure.
PATENTS. Not disclosed.

Cumar R30

CHEMICAL COMPOSITION. A synthetic resin; mixture of polymers of coumarone, indene, and homologous compounds.
SELLER. The Barrett Co.
APPLICATIONS. Insulated wire and cable, tires, adhesive tape, hard rubber goods, and delicately colored sheets.
PHYSICAL STATE. Neutral colored, odorless, viscous solid.
PROPERTIES. Sp. gr., 1.05 to 1.15 according to grade. Melting ranges, 20 to 40° C. (68 to 104° F.). Disperses readily in rubber. Soluble in practically all common solvents with exception of methyl and ethyl alcohols, butanol, and glycerine. Stable. Odorless. Cumar may be blended with limited proportions with a wide variety of bituminous materials, waxes, and mineral oils by heating slightly above its melting point. It is compatible with nearly all vegetable oils, but not with oleic acid. Cumar is neutral, waterproof, and resists acids and alkalies. Is an excellent insulation with high dielectric constant. Appreciably retards bleeding of organic colors.
PURPOSE AND FUNCTION. Selective for improving the processing and tackiness in uncured stocks, antiaging in storage, high polish in hard rubber, high electrical resistance in cable insulation. Maintains tensile properties, gives good abrasion and aging properties. EX grade Cumar increases Shore hardness and is especially adapted for tap compounds and other stocks where hardness is desired. In reclaiming rubber, the cumars impart softness and prevent the reclaims from drying-out, and facilitate smooth spreading of cements. They contribute antiscorching properties.
METHODS OF USE. Add directly to rubber.
VULCANIZATION. Retards rate of cure.
PATENTS. Not disclosed. Trade mark registered.

Cumar R H

Same as Cumar R30 except for the following.
PHYSICAL STATE. Neutral colored odorless solid.
PROPERTIES. Melting range, 77 to 95° C. (170-203° F.).

Cumar RS

Same as Cumar R30 except for the following.
PHYSICAL STATE. Neutral colored odorless solid.
PROPERTIES. Melting range 40 to 58° C. (104-136° F.).

Cycline Oil

CHEMICAL COMPOSITION. A blend of mineral and vegetable oils.
SELLER. Rubber Service Laboratories Co.
APPLICATIONS. Tires and mechanicals. Extruded and calendered products.
PHYSICAL STATE. Clear yellow oil with pale blue fluorescence.
PROPERTIES. Sp. gr., 0.89. 26.5° Baume at 15.5° C. (60° F.). Flash point, 375° F. Saybolt viscosity at 37.7° C. (100° F.), 105 to 115. Soluble in benzene, gasoline, dry alcohols, ethers, and acetones. Stable. Non-toxic. Disperses readily in rubber.
PURPOSE AND FUNCTION. Softens stock for ease of milling and calendering.
METHODS OF USE. Add directly to the rubber in mixing.
VULCANIZATION. Does not alter rate of cure.
PATENTS. Not disclosed.

Degras

CHEMICAL COMPOSITION. Refined wool grease.
SELLER. W. L. Montgomery & Co., Inc.
APPLICATIONS. Tire treads, mechanicals, reclaims.
PHYSICAL STATE. Semi-solid grease.
PROPERTIES. Sp. gr., 91.7 at 15.56° C. (60° F.). Melting point, about 36.11 to 42.22° C. (97 to 108° F.). Flashing point, 194.5 to 199° C., (381.2 to 390° F.). Stable. Non-toxic. Faint odor. Blends easily with rubber. Iodine about 27.
PURPOSE AND FUNCTION. Softener and aids dispersion of carbon black. Cold test −70° C. (−94° F.). Fire test, 250 to 280° C. (527 to 536° F.).
METHODS OF USE. Add directly to the rubber. Compatible with all rubber compounding ingredients.
VULCANIZATION. Does not alter the rate of cure.
PATENTS. Not disclosed.

Diplomer, Dark

CHEMICAL COMPOSITION. Polymerized terpenes.
SELLER. Hercules Powder Co.
APPLICATIONS. Reclaiming.
PHYSICAL STATE. Viscous dark liquid.
PROPERTIES. Sp. gr., 0.9580 minimum. Initial boiling point, 214° C. (417° F.) minimum. Distills, 215 to 360° C. (419 to 680° F.). Stable. Non-toxic.
PURPOSE AND FUNCTION. Softener of vulcanized scrap in reclaiming truck tire stock.
METHODS OF USE. Add directly to the scrap.
PATENTS. U. S. No. 1,737,775.

Forum 35

CHEMICAL COMPOSITION. Light paraffin oil.
SELLER. Standard Oil companies of New Jersey, Louisiana, and Pennsylvania; Colonial Beacon Oil Co.; and Penola, Inc.
APPLICATIONS. Reclaims and molded goods.
PHYSICAL STATE. Pale straw mobile liquid.
PROPERTIES. Sp. gr., 0.8778. Flash (open cup), 162.8° C. (325° F.). Fire, 190.6° C. (375° F.). Saybolt viscosity at 37.8° C. (100° F.), 74 seconds. Viscosity at 98.9° C. (210° F.), 37 seconds. Stable. Non-toxic. Odor sweet. Disperses readily in rubber.
PURPOSE AND FUNCTION. Permanent softener for molded goods and reclaiming oil.
METHODS OF USE. Add directly to the rubber or reclaim.
VULCANIZATION. Little effect on rate of cure.
PATENTS. Not disclosed.

Forum 40

CHEMICAL COMPOSITION. Light paraffin oil.
SELLER. Standard Oil companies of New Jersey, Louisiana, and Pennsylvania; Colonial Beacon Oil Co.; and Penola, Inc.
APPLICATIONS. Molded goods and reclaim.
PHYSICAL STATE. Pale straw mobile liquid.
PROPERTIES. Sp. gr., 0.8822. Flash (open cup), 191° C. (375° F.). Fire, 215.6° C. (420° F.). Saybolt viscosity at 37.8° C. (100° F.), 110 seconds. Viscosity at 98.9° C. (210° F.), 39.1 seconds. Stable. Non-toxic. Disperses readily in rubber.
PURPOSE AND FUNCTION. Permanent softener for molded goods and reclaim oil.
METHODS OF USE. Add directly to rubber or reclaim.
VULCANIZATION. Slight effect on rate of cure.
PATENTS. Not disclosed.

Genasco Hydrocarbon

CHEMICAL COMPOSITION. Bitumen.
SELLER. Barber Asphalt Co.
APPLICATIONS. Tire treads, mechanicals, heels, soles, battery boxes, and insulation.
PHYSICAL STATE. Hard lumps or granular.
PROPERTIES. Sp. gr., 1.10. M. p., 135 to 162.8° C. (275 to 325° F.). Stable. Non-toxic. Odorless. Blends with rubber readily.
PURPOSE AND FUNCTION. Softener and diluent for rubber. Facilitates processing.
METHODS OF USE. Add directly to the rubber in mixing.
VULCANIZATION. No effect on rate of cure.
PATENTS. Not disclosed.

Gilsonite Hydrocarbon

CHEMICAL COMPOSITION. Natural hard bitumen.
SELLER. Barber Asphalt Co.
APPLICATIONS. Tire treads, mechanicals, molded and extruded products.
PHYSICAL STATE. Black, hard, and lustrous.
PROPERTIES. Sp. gr., 1.10. Very pure bitumen. Stable. Non-toxic. Odorless.
PURPOSE AND FUNCTION. Diluent for rubber, increase of plasticity, resistant to acids, improvement of aging quality and insulating effect.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. No effect on rate of cure.

Hydrocarbon (Hard and Soft)

CHEMICAL COMPOSITION. Bitumen petroleum product.
SELLER. R. T. Vanderbilt Co.
APPLICATIONS. Tire treads, footwear, mechanicals, molded and extruded products.
PHYSICAL STATE. Black solid or granular.
PROPERTIES. Sp. gr., 1.04. M. p., hard grade 149° C. (300° F.); soft grade 82° C. (180° F.), ring and ball method. Stable. Non-toxic. Odor slightly oily. Blends easily with rubber.
PURPOSE AND FUNCTION. Softener for rubber. Improves tensile, tear resistance, and aging.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. Does not alter rate of cure.
PATENTS. Not disclosed.

Lead Oleate

CHEMICAL COMPOSITION. Obtained by the reaction of litharge with oleic acid or red oil.
SELLER. Stamford Rubber Supply Co.
APPLICATIONS. Tire treads, breaker and bead stocks, mechanicals, heels, and molded articles. In dark stocks only.
PHYSICAL STATE. Pale brownish waxy material.
PROPERTIES. Sp. gr., 1.34. Stable. Non-toxic. Odorless. Blends easily in rubber.
PURPOSE AND FUNCTION. Softening and lubricating in processing. Prevents blooming in the unvulcanized state. Stabilizes cure of the lower grades of rubber and improves their tensile properties.
METHODS OF USE. Add directly to rubber.
VULCANIZATION. Activates the cure and darkens the product.
PATENTS. Not disclosed.

M.R. 265°

CHEMICAL COMPOSITION. Bitumen petroleum product.
SELLER. R. T. Vanderbilt Co.
APPLICATIONS. Mechanicals, footwear, molded and extruded products.
PHYSICAL STATE. Black solid.
PROPERTIES. Sp. gr., 1.04. M. p., 129.5° C. (265° F.), ring and ball method. Stable. Non-toxic. Odor slightly oily. Blends easily with rubber.
PURPOSE AND FUNCTION. Softener for rubber. Improves molding, extruding, and aging.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. Does not alter rate of cure.
PATENTS. Not disclosed.

Mentor 28

CHEMICAL COMPOSITION. Petroleum oil.
SELLER. Standard Oil companies of New Jersey, Louisiana, and Pennsylvania; Colonial Beacon Oil Co.; and Penola, Inc.
APPLICATIONS. General rubber compounding.
PHYSICAL STATE. Clear mobile liquid.
PROPERTIES. Sp. gr., 0.8251. Boiling range, 265.6 to 357.2° C. (510 to 675° F.). Flash (open cup), 121.1° C. (250° F.). Fire, 151.7° C. (305° F.). Saybolt viscosity at 37.8° C. (100° F.), 40 seconds. Stable. Non-toxic. Disperses readily in rubber.
PURPOSE AND FUNCTION. Softener to eliminate or shorten breakdown of crude rubber and facilitate compounding. Little effect on oxidation characteristics.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. Slight effect on rate of cure.
PATENTS. Not disclosed.

Mentor 30

CHEMICAL COMPOSITION. Petroleum oil.
SELLER. Standard Oil companies of New Jersey, Louisiana, and Pennsylvania; Colonial Beacon Oil Co.; and Penola, Inc.
APPLICATIONS. General rubber compounding.
PHYSICAL STATE. Pale straw mobile liquid.
PROPERTIES. Sp. gr., 0.8498. Boiling range, 268.3 to 362.8° C. (515 to 685° F.). Flash (open cup), 126.7° C. (260° F.). Saybolt viscosity at 37.8° C. (100° F.), 45 seconds. Stable. Non-toxic. Disperses readily in rubber.
PURPOSE AND FUNCTION. Facilitates milling and compounding by softening the rubber.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. Slight effect on rate of cure.
PATENTS. Not disclosed.

Mineral Rubber

See Genasco, Gilsonite, Hydrocarbon (Hard and Soft), M.R. 265°, Paradura, Parmr, Pioneer Mineral Rubber.

Neville Oil No. 2

CHEMICAL COMPOSITION. Refined heavy coal tar oil.
SELLER. The Neville Co.
APPLICATIONS. Pliolite coatings.
PHYSICAL STATE. Viscous oil, amber color.
PROPERTIES. Sp. gr., 1.04 at 38° C. (100.4° F.). Boiling point, 300 to 360° C. (572 to 680° F.). Viscous. Non-drying. Characteristic mild odor. Stable. Non-toxic.
PURPOSE AND FUNCTION. Plasticizer for crepe rubber resin (Pliolite), compounding Pliolite finishes.
METHODS OF USE. As part of Pliolite solution.
PATENTS. Not disclosed.

Neville Resin

CHEMICAL COMPOSITION. Para coumarone-indene. A neutral inert synthetic resin of high degree of purity.
SELLER. The Neville Co.
APPLICATIONS. Tires, inner tubes, mechanicals, cements, hard rubber, and DuPrene stocks.
PHYSICAL STATE. Semi-liquid to high melting. Solid, yellow to brownish-black in color.
PROPERTIES. Sp. gr., 1.08. M. p., 10 to 160° C. (50 to 320° F.). Stable. Non-toxic. Characteristic mild odor.
PURPOSE AND FUNCTION. Imparts a durable tackiness making possible the use of cheaper stocks. Very effective in tire friction compounds and tapes where white stock is required. Helps produce smooth running extruded stocks. No harmful effect on aging quality. When heated above its melting point, it dissolves rubber, and up to 10 to 12% of sulphur by weight. The 25° C. soft grades (R-27 or R-28) may be used in all DuPrene compounds where tackiness is required.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. No effect on rate of cure.
PATENTS. Not disclosed.

Nevoll

CHEMICAL COMPOSITION. 100% coal tar derivative.
SELLER. The Neville Co.
APPLICATIONS. General rubber compounding.
PHYSICAL STATE. Viscous liquid.
PROPERTIES. Sp. gr., 1.08 at 16° C. (60.8° F.). Partly volatile. Non-toxic. Characteristic odor. Flows freely at working temperatures. Disperses readily in rubber.
PURPOSE AND FUNCTION. Softener in rubber compounding. Mildly activating effect on accelerators. Good calendering and tubing properties. Improves tear resistance.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. No effect on rate of cure.
PATENTS. Not disclosed.

Palm Oil

CHEMICAL COMPOSITION. Glicerides Palmitin and olein.
SELLER. Wishnick-Tumpeer, Inc.
APPLICATIONS. Mechanicals, footwear, and extruded goods.
PHYSICAL STATE. Deep orange semi-liquid.
PROPERTIES. Sp. gr., 0.800 at 50° C. (122° F.). M. p., 25 to 50° C. (77 to 122° F.). Volatility, 3 to 5%. Non-toxic. Vegetable odor. Disperses readily in rubber.
PURPOSE AND FUNCTION. Rubber softener, plasticizer of rubber, and dispersing agent for pigments.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. Does not alter rate of cure.
PATENTS. Not disclosed.

Paradura

CHEMICAL COMPOSITION. Bituminous product.
SELLER. H. H. Robertson & Co.
APPLICATIONS. Tire treads and mechanicals.
PHYSICAL STATE. Hard lumps.
PROPERTIES. Sp. gr., 1.10. M. p., 182.2° C. (305° F.), ring and ball method.
PURPOSE AND FUNCTION. Softener for rubber mixings, increase in tensile, resistance to tear and abrasion and improving aging quality, over other bituminous products.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. No effect on rate of cure.
PATENTS. Not disclosed.

Paraffin Wax, Crude Scale

CHEMICAL COMPOSITION. Mineral paraffin wax.
SELLER. Standard Oil companies of New Jersey, Louisiana, and Pennsylvania; Colonial Beacon Oil Co.; and Penola, Inc.
APPLICATIONS. Molded goods, hose, and jar rings.
PHYSICAL STATE. Cream white wax.
PROPERTIES. Sp. gr., 0.905 (approximate). M. p., 49.44 to 51.67° C. (121 to 125° F.). Stable. Non-toxic. Almost odorless.
PURPOSE AND FUNCTION. Stiffener and gives protective bloom against sun cracking.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. No effect on rate of cure.
PATENTS. Not disclosed.

Paraffin Wax, Refined

CHEMICAL COMPOSITION. Mineral paraffin wax.
SELLER. Standard Oil companies of New Jersey, Louisiana, and Pennsylvania; Colonial Beacon Oil Co.; and Penola, Inc.
APPLICATIONS. Molded goods, hose, and jar rings.
PHYSICAL STATE. Solid, white wax.
PROPERTIES. Sp. gr., 0.903 (approximate). M. p., 49.44 to 50.56° C. (121 to 123° F.). Stable. Non-toxic. Odorless.
PURPOSE AND FUNCTION. Stiffener and gives protective bloom against sun cracking.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. No effect on rate of cure.
PATENTS. Not disclosed.

Paraflux

CHEMICAL COMPOSITION. Saturated hydrocarbon obtained by polymerization under high heat and pressure.
SELLER. C. P. Hall Co.
APPLICATIONS. In any dark stock for molded goods.
PHYSICAL STATE. Black solid.
PROPERTIES. Sp. gr., about 1.01. Viscosity at 212° F. Saybolt 77. Stable. Non-toxic. Disperses readily in rubber.
PURPOSE AND FUNCTION. Economy of processing by rendering stocks plastic and tacky.
METHODS OF USE. Mill directly into rubber.
VULCANIZATION. No effect on rate of cure.
PATENTS. Not disclosed.

Paraflux 2016

This is a light grade of Paraflux (*which see*).

Parmr, Grade No. 1

CHEMICAL COMPOSITION. Standard blown bitumen residue.
SELLER. Binney & Smith Co.
APPLICATIONS. Tire treads, footwear, mechanicals, heels, insulation, and extruded products.
PHYSICAL STATE. Solid.
PROPERTIES. Sp. gr., 1.04 minimum. Grade No. 1, M. p., 143.3 to 154.4° C. (290 to 310° F.).
PURPOSE AND FUNCTION. Softener and diluent for rubber. Facilitates extrusion and molding and improves aging.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. No effect on rate of cure.
PATENTS. Not disclosed.

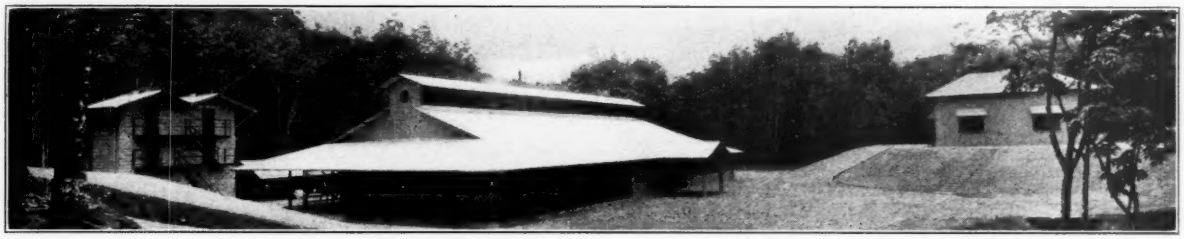
Parmr, Grade No. 2

Same as Grade No. 1, except properties.
PROPERTIES. Sp. gr., 1.04 minimum. M. p., 157.2 to 168.3° C. (315° to 336° F.).

(*To be continued*)

Modern Rubber Research

New Plantation Laboratory in Ceylon for Problems of Producer and Manufacturer



The Factory and Laboratory at Dartonfield Estate

THE Rubber Research Scheme purchased Dartonfield Rubber Estate (178 acres) in the Kalutara district of Ceylon for experimental purposes in 1933, and the construction of an experimental factory and chemical laboratory on the estate was recently completed. The buildings were officially opened and inspected February 25, 1935, by the Governor of Ceylon, His Excellency Sir R. E. Stubbs, G.C.M.G., with members of the Rubber Research Board and some 200 rubber planters.

The Dartonfield experimental factory is intended to provide facilities for the routine manufacture of the estate crop and demonstration of the manufacture of crepe and smoked sheet under model conditions; experimental work on preparing raw rubber in alternative forms and observations on the efficacy of present methods; and experimental work on the utilization of rubber and the local manufacture of certain types of vulcanized products.

The building is approximately 125 feet long by 65 feet wide divided into 2 sections by a central packing room and storeroom. One end is equipped for raw rubber manufacture, and the other for vulcanization work. Machines throughout the factory have individual motor drives, making possible the study of power consumption at each stage. Power is supplied by a 52/57 h.p. Ruston Hornsby 3-cylinder vertical oil engine coupled direct to a 35 kw. dynamo generating current at 230 volts. Supplementing this is a 9 h.p. Lister single cylinder engine also run in conjunction with a generator.

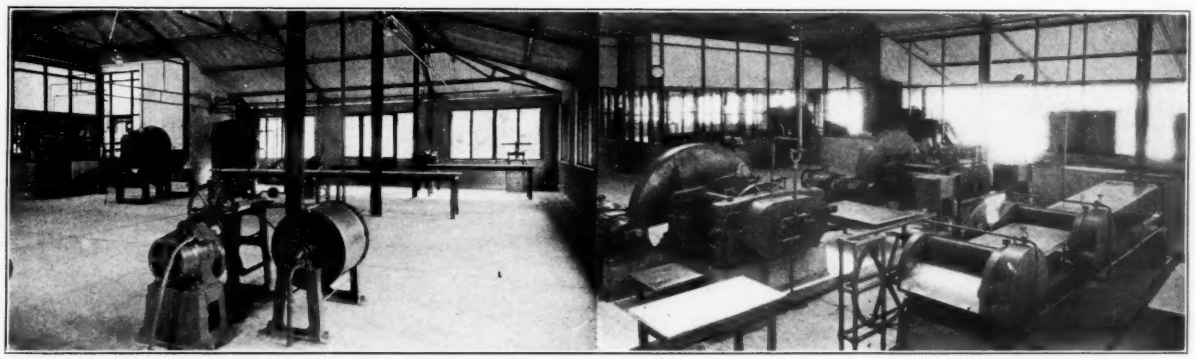
While the routine rubber making plant does not differ essentially from the normal equipment used in Ceylon factories, certain features call for brief comment.

Latex is run into the coagulating tanks inside the building from 2 cement settling tanks placed on the verandah. There are 2 coagulating tanks for crepe manufacture, one of which is lined with white tiles, and the other with acid resisting cement. Sheet coagulation is done in pans or in a partitioned aluminum tank. The crepe rolling machines have been strengthened and enlarged to apply higher pressures. The rollers, 26 inches long and 14 inches in diameter, are internally cooled by water. The smooth rollers are also provided with a steam heating arrangement so that in case of need they can be used as masticating and mixing rollers. For experimental purposes variable speed motors have been installed for driving these machines so that the speed of the rollers may be varied by 50%.

The sheeting plant consists of one smooth mill and one spiral grooved sheeting mill mounted in tandem on a single framework. Each pair of rollers is independently driven by a variable speed motor with V-belt silent drive.

The experimental side of raw rubber production is equipped with semi-commercial scale apparatus for preparing rubber in crumb form. A small high-speed disintegrator breaks up the coagulum into a wet crumb, which is then dried in a rotary drier through which air is blown.

(Continued on page 44)



Experimental and Vulcanizing Plant **Interior View of Dartonfield Factory**

Future Problems in Rubber[1]

E. A. Hauser [2]

A CAREFUL analysis of present conditions in the rubber industry in the light of our present-day knowledge of chemistry, physics, and mechanics indicates that the following problems will be of outstanding importance in the near future.

No startling or revolutionary developments are to be expected in the routine procedure of manufacturing rubber goods by the mastication and calendering processes or by the use of rubber dissolved in organic solvents in the production of dipped goods. Undoubtedly further improvements in the mechanization of the process will be achieved. Improvements in compounding will enable us to produce goods of better quality. There will be improvements in filler dispersions, low-sulphur cures, etc., but that is about all we may expect in the mastication and vulcanization processes discovered 100 years ago.

Perhaps the only real problem in connection with the actual production of rubber goods is the direct application of latex. It took years of hard and complicated research to learn even the fundamental properties and behavior of latex. In recent years, however, we have learned how to produce dipped goods of unsurpassed quality from latex so simply that a child could operate the machinery. We have learned how to make rubber thread of circular cross-section and how to impregnate various materials such as fabric, paper, etc. Recently processes have become known which enable us to produce in one single and simple operation seamless hollow rubber goods, such as balls, rubber dolls, and surgical goods, as well as seamless rubber footwear. This development would have been impossible if we had not applied our knowledge of colloid chemistry and physics to this unique, natural, colloidal dispersion called latex. But only the surface of a development of unpredictable possibilities has been scratched. A structural difference between mechanically and chemically deposited latex films actually exists. Milled rubber may not be overlooked when properties such as abrasion resistance and the like are the goal. A study of latex compounding and compounding ingredients, chemical mastication, dispersibility, elimination of surplus water, etc., are items of vital importance. There can, however, be no doubt that the direct application of latex in the manufacture of rubber goods is one of the important problems of the present day. When solved, it will prove a great stimulus to the further development of manufacturing processes.

We must differentiate clearly between a truly synthetic product, which not only exhibits rubber-like properties, but also corresponds chemically to the formula of the natural hydrocarbon, and organic compounds, which, although exhibiting properties such as elasticity and resilience, do not correspond chemically to the natural hydrocarbon. An example of the former is the recent German process for polymerizing butadiene as a byproduct in the hydrogenation of lignite. An example of the latter is the American product DuPrene, a polymerization product of chloroprene (isoprene in which the methyl group has been substituted by chlorine). The butadiene polymer resembles rubber in every respect, the differences being in the degree to which one or the other property is present. DuPrene exhibits properties unlike rubber—i. e., final cure in the absence of sulphur, no need of accelerators, high oil resistance, low abrasion resistance, etc.

The time has not come to argue the importance of these developments in competition with the production of plantation rubber because the development of these complex processes is far too young. On the other hand the recent improvements in plantation practice—for example, selected seeding, bud grafting, fertilizing, etc.—will have considerable bearing on production costs in the near future. Nevertheless it would be very short-sighted to disregard these developments for a moment. We can broaden our knowledge by comparing the properties of original Para rubber, plantation rubber, and synthetic rubber—for example, higher tensile strength, higher abrasion resistance in Para and synthetic rubbers as compared with plantation rubber cured in the absence of accelerators, higher resistance to solvents and oils, tougher stock to start with, better aging. The analysis of native Brazil rubber shows the presence of oxygen in minute quantities, as does synthetic rubber. The original physical properties of certain goods made years ago with oxygen-liberating vulcanizing agents have remained unchanged. We know that oxygen destroys rubber only if present in large quantities. Hence one of the important problems involves a systematic study of the role oxygen plays. This problem is as important to the factory as to the plantation. There is no reason why, with our present knowledge, we should not find means to assist Nature to produce a rubber on the plantation of as good quality as she turns out in the Amazon jungles. A wide field of chemical research is ready to be attacked.

In this connection, the various derivatives known as thermoplastics, mainly used as bonding agents in coating with rubber, will not be discussed. Our chief concern here is with chlorine derivatives or reaction products of rubber with chlorostannic acid or anhydrous hydrogen chloride. The introduction of chlorinated rubber as an anticorrosive paint vehicle and of Plioform and Pliolite, and finally the recent development of a Cellophane-like, transparent, rubber-hydrogen chloride film which is nonflammable, moisture-proof, heat-sealable, etc., are just the beginnings of a development of great promise.

Questions of stabilization of the compounds, improvement in tensile strength, elasticity, etc., must still be improved upon; at the same time research in regard to the reactions actually taking place, the compounds being produced, etc., will not only reveal valuable information, but will help us in working out new reactions and new products. The problem of rubber derivatives is undoubtedly one of the most fascinating and promising fields our industry has to offer for the very near future.

[1] This paper is a summary of several addresses delivered before meetings of local sections and the Division of Rubber Chemistry groups of the American Chemical Society during Dr. Hauser's stay in the United States from December, 1934, to February, 1935. Reprinted from *Ind. Eng. Chem.*, News Ed., Apr. 20, 1935, p. 179.

[2] Semperit Austro-American Rubber Works, Ltd., Vienna, Austria.

Methods Engineering in Footwear Manufacture

David Phillips

METHODS engineering, or what is perhaps better known to industry as industrial planning, has become definitely recognized as an important contributing factor in management's efforts to reduce costs. The processing of rubber, like various other manufacturing ventures, has become a fertile field for this type of engineering.

Present methods of manufacturing footwear present an interesting example of what has been accomplished through careful analysis of existing procedures and the improvement in factory processes has ultimately resulted in considerable cost reduction.

Replacing Former Methods

The bench plan of making shoes, either entirely from leather or from rubber materials, was in existence for many years, and, incredible as it may seem to many of us as we witness modern mass production, a single worker formerly made the entire shoe. Numerous small tools at his bench and fixtures for labor saving were located close at hand to make the worker's performance of his duties as efficient as possible; daily output was definitely dependent upon the individual's skill and other human factors. The analysis of the shoemaking operations as performed in bench-method days has best been accomplished by time study or breaking down into elements the detail movements involved. These elements have then been studied and balanced against production needs and costs.

Many different methods, or schools, for comparing the elements of the making operations and for sub-dividing the shoe assembling tasks have been followed. Ultimately they all have led to the general abandonment of the complete, bench-method shoemaking system.

Time Study—the Planner's Yardstick

Keen observation, coupled with dexterity in stop-watch reading, can provide very complete data on complicated making operations, thus enabling the process engineer to study the problem at hand. In gum shoe making, for example, any one of the numerous, simple operations which are performed thousands of times daily, such as adding a toe tip, outersole positioning, or uppering, must be analyzed on at least two points. First, shall the shoe parts be added to the shoe as it is assembled on its form; or secondly, is it better methods engineering to bring the shoe itself to these loose parts as they lie upon a table, moving belt, or other supporting fixtures?

Common sense backed up by stop-watch readings shows pretty conclusively that in the case of the gum or friction tip it should be added to the shoe on the form as it must be carefully drawn down around and under the toe onto the inside or filler sole. This prevents wrinkles and gives the proper binding effect. The case of positioning the outersole presents a more complicated procedure as its placing requires considerable accuracy and finger dexterity. At best we find uncured soling stocks subject to varying degrees of contraction or shrinkage with questionable adherence to pattern outline and having edges which are angled in shifting degrees. Besides these irregularities in the shoe part itself, the adhesive qualities are often not of the best. Outersole placing is a precision task; and sloppily positioned, the outersole can do much to detract from the finished appearance of the shoe.

Weighing points similar to the above, which enter into the problem of subdividing shoemaking tasks and considering them in their relation to the modern carrier system or rack truck plan for assembling, it is found that an efficient time analysis can be worked out. Back of it all the stop-watch provides a very accurate yardstick upon which to base decisions as to where and just how a shoe part can best be positioned.

Piece Work Sets the Pace

Process engineers in gum footwear plants found some twenty years ago that the problem of increasing shoe production to meet growing demands could not be solved economically by merely adding more and more workers at the bench. Take a group of old-time shoemakers for instance; at that time each of the individuals prepared and fitted together practically all the parts which went into the shoe. Possibly an average of thirty pairs might be turned out by each worker, but adding more and more such workers meant building a like number of benches with the consequent tying up of an ever-increasing amount of expensive floor space.

The benches themselves were arranged as efficiently as possible at that period, limited as things were with old floor-plan layouts. Rollers, stitchers, metal gages, cement cans, brushes, knives, scissors, and other tools of the gum shoe makers' trade were handily stored. Delivery or odd stock boys raced about crowded aisles, supplying the component materials as needed in answer to the shouted demands of the lackers. Handily placed metal racks were located, generally at the rear of the bench space, to receive shoe bars. These bars had fitted plugs or pins to support lasts after each series of making operations had been carried out. A few stick loads might be "uppered" and then after cementing for outersoles, were stored in these racks to dry while a similar batch were being likewise prepared.

From a process engineering standpoint much that was inefficient was obvious. Materials delivery, methods for removing completed goods to the varnish or heater cars, fire hazards, lack of inspection facilities, low individual output, and many other glaring faults were very apparent. Experience has proved that if a person does one single thing often enough, it becomes more or less automatic, and with constant repetition the quality can be

improved; hence the reasoning that if gum shoe linings were to be pulled over or lasted, a group of workers doing nothing else but one or two such sub-divided tasks could doubtless turn out more production as a group than as individual workers who themselves performed all the operations connected with shoemaking. In other words, production figures from a group of specialists should surpass similar figures for a like number of ordinary, jack-at-all-trades, bench makers, each of whom had to complete entirely the many elementary assembling operations.

Piece-work payments or rate setting for compensating the worker, based fairly upon performance, is difficult to determine. Process analysis, aided by averaging stop-watch readings of the elementary operations involved in shoemaking and allowing suitable time for weariness and other depredating factors, soon devised new kinds of working places and better methods. Team work with its four or five workers conveniently grouped about a common assembly table frequently comprised a production unit; and by utilizing this scheme as a starting point, much progress has been made in increasing the daily yield per person in terms of finished goods. It is piece work alone which has set the pace leading to our present-day highly specialized practice of breaking down the complicated shoemaking operations.

Balancing the Process Elements

In many classes of work process engineering has made exhaustive tests and studies involving highly technical data in order to locate a worker at a suitable bench or station which can provide him with the minimum amount of body movements for a maximum of output. Finger dexterity, wrist, forearm, upper arm, and body motions have frequently been analyzed on the basis of light or heavy work; table heights, tools, component parts of the article in process, and other variables have also been so grouped as to provide the utmost in working efficiency.

Footwear manufacture is fast approaching a standardized condition on many items, and from what is generally known of present production methods, considerable progress in planning engineering has been made. One of the greatest remaining problems appears to concern the group of workers known as a team instead of the individual employe. The lone operator has always been a necessary part of any manufacturing venture, and with stop-watch readings his rate setting problem is not particularly difficult. In gum shoe manufacture a mallet and die cutter, upper cutter, or the worker who machine cuts outersoles might be considered as such. In the case of the latter, his combined machine and work bench is before him. Slabs of uncured soling sheets are at hand, and with a machine traveling at a known speed output, rate setting, extra payments, and other operating problems are not very complicated.

Team work or any operations involving a large balanced group, each of whom is dependent upon his co-worker for a supply of partly processed materials and upon a following worker for the removal thereof after his own particular link in the manufacturing chain has been completed, offers a real problem to the planning engineer.

In the above problem the makers' working place might not necessarily be at a fixed location; such a group of workers are frequently placed along a moving belt or assembly chain. To be sure, each operator must be so positioned in any plan for processing that his individual function dovetails with a co-worker, but when such is the case with a large assembly group, any delay caused by one of the individuals comprising it from lack of materials, poor workmanship, or other hazard factors, immediately affects the compensation or labor hours of the entire body. Lost time by an individual or single unit of such a group must be multiplied by the number of allied workers made non-productive through one person's enforced idleness. The total lost-time figure based on hourly production varies directly with the size of the group, but in any case must be charged against profit and loss.

Proper time-study balance of the elementary tasks, arrangements for materials to be delivered where needed and at the correct time, with varying production schedules makes a very complicated problem for the process man. Efficient arrangement of the individual's working place or station for accessible storage of tools and materials is a big help in avoiding delays to steady production.

Outersoles, gum uppers, and many other component parts of rubber footwear must be conveniently located in large quantities so that a minimum of effort and deviation from direct assembly work is caused the operator. Correct bench facilities are of great importance.

Methods Engineering Improves the Product

When we hear that an article has been fabricated by mass production methods, one instinctively questions quality. Footwear is no exception, and up to the time bench shoemaking was forced to give way to rack methods, conveyer carrier systems, and other progressive plans, it was largely a case of finished appearance.

If the outside of the shoe looked well, had its seams properly closed, and outersole well rolled along the bottom and edges, it got by. Workers were generally conscientious and did their best to put the shoe parts together properly; however even those of strongest physique could not be depended upon consistently to give each shoe part its correct amount of rolling pressure or stitching where needed. Materials were often not up to standard owing to inadequate inspection facilities and found their way into the shoe.

It is quite evident that proper inspection could not be made during the shoemaking process when most of the work benches were in blind alley layouts. The aisles leading to them were usually cluttered with shoe stick bars, spare shoe lasts in baskets, cement pails, and many other tools of the trade. An overseer could not possibly investigate the quality of each individual minor assembly as the makers progressed down through their daily "tickets" of footwear.

Such items as filling innersoles might be wrinkled when applied, or a toe end of an upper might be improperly drawn down on to the innersole, its jagged edges not trimmed flush; and countless other operations which, carelessly performed, would ultimately cause poor wearing quality and appearance in the finished product. True enough, in many plants the makers' identification numbers were stamped on the shoes before they were collected for varnishing or curing, but even so, after the footwear had been completed, if it should be of poor quality inside, no one except the wearer would be likely to discover its defect. Even if it were noticed at the factory, one could not afford to mark down many completed shoes for not making the grade.

Modern planning of the shoemaking procedures and the shift in methods to group assembling have done much to increase quality and to permit easy survey by the overseers of the parts all through the making process. A group of workers turning out the same article during their entire working hours and located in a modern plant in full view of their group leader cannot get very far with

(Continued on page 36)

The Foreman's Job

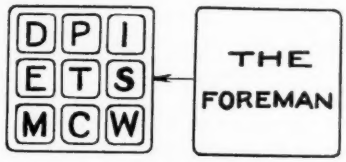
Cooperation Important in Foremanship

G. F. Buxton [1]

THE following is a continuation of the treatment of that phase of the foreman's job showing how important is cooperation, begun in our May issue.

Cooperation Sidewise

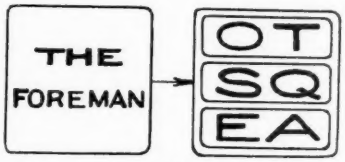
The second type of cooperation, with men in charge of different departments, furnishes the most numerous occasions for "working together agreeably." There are many day-by-day and hour-by-hour relations with other foremen and department heads, that are concerned with routine work and likewise with the meeting of the daily production schedule.



D—Design, Laboratory, Tooling; P—Production Scheduling and Control; I—Inspection and Quality Control; E—Employment and Personnel Service; T—Training, Transfer, and Discharge; S—Safety and Health Promotion; M—Maintenance of Equipment; C—Cost Control and Accounting; W—Warehousing and Shipping

Fig. 1. Cooperation with Heads of Various Departments

A production foreman checks the schedules as he gets ready to meet them. He sometimes finds that they are not workable and succeeds in having them modified. At times his suggestions may have an influence in making future schedules. There are opportunities for cooperation in the making and the carrying out of production schedules.



OT—On Time, Avoiding Production Delays; SQ—Standard Quality, Ready for the Next Department; EA—Extra Accommodation, Helping Other Foremen Where Possible

Fig. 2. Cooperation with Other Production Foremen

Maintenance

What contacts does the production foreman have with the tool room and with the men in charge of plant repairs and upkeep? Can he help these men by making requisitions for tools and repairs some time in advance of the actual need?

There are possible irritations due to a congestion of work at rush periods and a lack of work at other periods. Some of these may be avoided by a spirit of mutual helpfulness on the part of the heads of departments involved. Foremen, if they work with a common interest, may suggest minor changes in ways of handling the job. Tools and repairs may be better suited to their uses if done with the needs of the other department in mind.

Materials and Product

A foreman has many contacts with the stock room, with the purchasing and receiving departments, with stock chasers and others concerned with the control and handling of materials needed by the foreman. He finds many ways to help keep the supply of such materials moving smoothly and regularly into his department as needed. Being definite as to specification and considerate as to time for deliveries helps eliminate some misunderstandings and delays.

There are also many contacts with men in charge of the warehousing and the shipping of the product. Helping to get deliveries from each department ready for storage or delivery to customers as needed requires the cooperative attitude of each foreman connected with getting out the production order.

Other Foremen

Immediate contacts are frequent between foremen in adjacent departments. "Working together agreeably" becomes imperative if production is to run smoothly. A foreman has less direct and less frequent, but important contacts with foremen in more distant departments. All foremen must attempt to work together for a satisfactory manufacturing program.

Some of the elements that cause friction and delays between departments are:

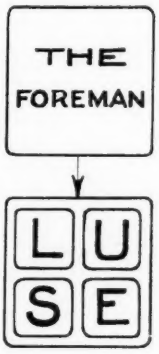
Work produced in the wrong sequence for the next department.

The product lacking some quality, the absence of which makes later operations more difficult.

Delays in making complete or partial deliveries to the next department.

Unwillingness to do extra work very much needed by another foreman.

Perhaps equally important with accuracy in meeting inspection standards and promptness in meeting scheduled delivery times is the willingness to accommodate other foremen in minor details.



L—Liking for the Job; U — Understanding of Work; S—Skill as an Operator; E—Effort and Application

Fig. 3. Cooperative Attitude toward Employes, Helping the Worker to Show the Above Qualities

Other Departments

Heads of various non-productive departments have direct or indirect relations with the production foreman. Occasions here also exist for cooperative effort.

The cost department, while making a practice of asking for reports and figures at convenient times, sometimes finds it necessary to speed up such requests at inconvenient times. The foreman will do his best to accommodate the office force. This is easier where there is a general feeling of good will between the office and the shop.

Engineering, experimental, and developmental departments may want the use of special equipment, or a trying out of new methods in a

[1] Professor of industrial training, Purdue University, Lafayette, Ind.

production department, or the running of special tests. While such work may interfere with a straight production program, a foreman can usually find a way to make such tasks possible. It mostly depends upon his attitude toward these department heads. Good feeling toward such heads makes cooperation easier.

And lastly and perhaps most important of all is the foreman's relation to the personnel department. He has many occasions to deal with the people who furnish him with employes and who assist him in various dealings with these employes. The personnel department will be willing to go more than half way in establishing agreeable relations with the production departments, but the production foreman must do his part too.

Cooperation Downward

The third type of cooperation is with the workers in one's own department. It involves the matter of leadership, of getting the active interest and response of the worker. It means that the foreman has been able to "sell the job" to the man who is to do it. It usually implies a liking for the men who are working under the foreman's orders, and a practical understanding of human nature. It also includes an ability to spread enthusiasm out among the members of the working force.

In getting this cooperative effort the first step may be that of analysis of the operations to be performed, from the standpoint of the worker's adaptability to such work and in order that proper instructions may be given to fit the worker satisfactorily to the job. (This point will be covered in a later issue.) Such an analysis may show the kinds of information which should be given to the worker so as to have the work done intelligently. It may show also various things about the job that appeal to the worker's interest.

Man Requirements

An important element in gaining the cooperative response of the employe is to have the right employe on the job. A foreman can frequently help secure the right employe by analyzing the "man requirements" of the job. Different jobs make different demands upon workmen. Some work requires physical strength and endurance. Others require hand skill, with both accuracy and speed. Still others require a considerable general intelligence, special knowledge of the job itself, mechanical judgment related to the job, or a high degree of dependability. Some jobs may be considered as temporary, helper, or apprentice jobs, leading to better work later. Others are more permanent, demanding workmen who may spend many years at the bench or machine and who will continue to become more expert from year to year.

Present Employes

To obtain the best cooperative effort of employes it is desirable to analyze the qualifications of workers now on the payroll and to study their adaptability to the jobs which they now hold. We may analyze men as well as jobs.

Men are hard workers in varying degrees. They are honest in varying degrees. They have skill, interest, friendliness, loyalty, persistence, and other traits in varying degrees. Some of these traits are of large potential value, and most of them may be increased under capable supervision. A foreman has the opportunity of discovering these traits and of developing them to a considerable extent in his men. He should realize that these abilities, both innate and acquired, are special, and that there is no such thing as interest, skill, or endurance, in general. He must realize that there are interests in special things, skill in definite kinds of work, and endurance in certain directions. Utilizing and developing these traits must be done in special directions. The foreman must determine whether there is a possibility in any given case for worthwhile development of special abilities.

Bring Out the Best

The following suggestions are offered with the idea of bringing together a number of ways a foreman may use in securing the best cooperative effort of the workers in his department. No rules of universal application are possible, but the suggestions below are being found of value by different foremen in getting men to work together with the spirit of a good team. (This topic will be discussed fully in a forthcoming number.)

Get the worker's interest in the immediate work to be done. Find something which will make a direct appeal to him. Find out what he likes to do and see if it is related to what he is supposed to do.

Watch for a slackening of interest and effort in routine work. See if there is a way of relieving the monotony of the job or of eliminating the objectional feature.

Watch for a change of interest and a diverting of effort into undesirable channels. See if this diverted interest may be redirected into a profitable activity.

Note the physical requirements if a peculiar job fatigue is appearing. See if the fatigue may be reduced by changes in motions, speeds, positions, hazards, noises, temperature, ventilation, or illumination.

Note the adaptability of the worker to the job. See if he has the intelligence or the physical fitness for the work. If not, see if he can be fitted to another job.

Realize at all times the need of treating employes in a human way, appealing to the best cooperative interests in them and giving them your best cooperative efforts in return.

Methods Engineering

(*Continued from page* 34)

poor work as it is immediately noticed and corrected. A damaged component part is much cheaper to discard before assembling than a completed shoe into which it has become vulcanized.

Modern process engineering aside from sub-dividing shoemaking tasks has thus at the same time done much to improve quality by exposing to full view the contributing shoe parts, all through their making routine.

Methods and Work Places Need Constant Study

The general acceptance of the flat belt or conveyer chain plan for shoe assembling by the footwear industry will doubtless lead to further study and balancing of the sub-divided tasks in order to increase its efficiency. Work-bench layouts for producing and assembling footwear parts have been very badly handicapped because of the plastic and adhesive nature of the product itself. The handling of rubber shoe parts offers many problems uncommon to other industries, and constant study should be made to eliminate the costly delays and stock losses which result from its damage during the process. In view of the very complete studies which other manufacturers have been able to make when handling a more adaptable product, it is logical to expect that their high degree of efficiency will be reflected in the rubber industry. Constant study of rubber handling both from the worker's angle and from the process engineer's viewpoint will surely lead to more economical set-ups in bench layouts and manufacturing methods.

Retreading Patents

Joseph Rossman, Ph.D.

THE following abstracts of United States patents for third circle retreading, full circle retreading vulcanizers, recapping vulcanizers, and special retread molds continue the informative article from our May issue.

73. Campbell, 1,605,391, Nov. 2, 1926. A reducing shell for cavity molds has projections arranged to space the shell proper away from the surface of the mold.

74. Ruark, 1,608,816, Nov. 30, 1926. A vulcanizing mold for retreading rubber tires comprises a hollow metallic body made up of a plurality of semi-circular sections adapted to be detachably connected together and having cooperating portions adapted to bear upon the entire tread surface of a tire shoe when the sections are connected together. Each of the sections is interiorly provided with a plurality of steam chambers. The chambers of each section are in communication with each other and with the chambers of the other section when the sections are connected; the sections are constructed so that the chambers thereof are disposed radially outward and beyond the sidewalls of a tire when the tire is arranged with its tread surface in contact with the tread bearing portions of the sections.

75. Eno, 1,609,510, Dec. 7, 1926. A vulcanizing apparatus comprises a segmental mandrel, a segmental pressure exerting member mounted adjacent the mandrel, a pair of oppositely disposed lever arms pivoted on the segmental pressure member adjacent the ends thereof, means for moving the pressure member toward and from the axis thereof, and means connecting the lever arms together for moving them in unison on their pivots.

76. Campbell, 1,611,884, Dec. 28, 1926. A vulcanizing device comprises a boiler, pipes projecting outward and upward from it, curing arms extending across and connecting the pipes, a yoke adjustably secured to the pipes, a saddle bar slidably mounted on the pipes between yoke and curing arm, and means for drawing the saddle bar toward the yoke.

77. Wheelock, 1,617,829, Feb. 15, 1927. A retreading vulcanizer has a base member, segmental vulcanizing units opposite one another upon the base member, and a pressure device located within each unit. The pressure devices are connected to a common actuating member to force them against the interior of the casing. The ends of the units are spaced apart to leave segments of the tire of sufficient length to permit distortion thereof to assume any required curvature.

78. Baffetti, 1,619,231, Mar. 1, 1927. A tire vulcanizer has an annular section of trough shaped mold, an annular section of trough shaped tread plate fitting within the bottom of the mold, two annular sections of outer bead plate abutting against the edges of the tread plate, means to force the outer bead plates against the tread plate and thereby the tread plate against the mold, two annular sections of inner bead plate, means to clamp the bead of the tire between the outer and the inner bead plates, a sand bag disposed within the shoe to be vulcanized, means for exerting pressure on this bag, and means for heating the mold.

79. Heintz, 1,623,677, Apr. 5, 1927. A vulcanizer has a hollow arcuate shaped core with angularly disposed surfaces along its inner side and adjustable blocks connected to the surfaces, and shaped for engagement with the heads of a tire casing arranged upon the core and a covering adapted to envelop that portion of the casing arranged upon the core.

80. Brooks, 1,628,766, May 17, 1927. A vulcanizing apparatus comprises two end plates, a plate in the form of an inverted channel extending between the end plates, an electrical heater arranged within the channel, a thermostatically controlled switch for the heater, the thermal element of the switch including a tubular member extending lengthwise through the channel and serving as a tie rod to fasten the aforesaid three plates together.

81. Wheelock, 1,630,457, May 31, 1927. A vulcanizer comprises a base member provided with a tread plate section, a plurality of vertical studs at the corners of the base member, a frame slidably engaged over the tread plate section of the base member, a plurality of apertured members projecting from the corners of the frame and adapted to engage over the upper ends of the studs, resilient members interposed between projecting members of the base and frame, and means on the studs for limiting the upward movement of the frame.

82. Wheelock, 1,630,815, May 31, 1927. A tire repair vulcanizer of the internal heated arm-type comprises a longitudinally arcuate, sectional core adapted to support a section of a tire to be repaired thereover, separate longitudinally arcuate tread and side pressure plates having yielding pressure faces and adapted to be fitted about the section of the tire on the core, and means for pressing the plates against the tire.

83. Lewis, 1,631,042, May 31, 1927. A vulcanizer comprises a base having a groove and a recess therein, a burner tube in the groove with its ends bent and resting in the recess which acts as an initial heating means, a nozzle carrying member supported on the base above the recess, an extension on the burner tube for receiving the vapor from the nozzle, and means for supplying fuel to the nozzle carrying member.

84. Semler, 1,637,879, Aug. 2, 1927. A tire repair vulcanizer includes a mandrel enclosed in a shell comprising a section secured to the mandrel; the section has slots therein, nuts slidable in the slots, screws in the nuts, and a bead presser adapted to be engaged by the screws.

85. Marble, 1,640,281, Aug. 23, 1927. A vulcanizing mold for tires comprises segmental arc shaped metal blocks on the sides of a metallic steam drum completely filling a section of the shoe, metal blocks inclosing the outer surface of the shoe, and means for applying heavy pressure during vulcanization.

86. Howell and Sapp, 1,641,490, Sept. 6, 1927. A tire vulcanizing mold comprises hollow sections to surround a tire, pivot means connecting the sections at one end to enable them to be separated or brought together at will, a spider fixed only on to one section, means for supporting the spider, an arm projecting from the spider past and adjacent the other section, the arm having a slot

concentric with the pivot means, and a pin projecting from the other section and riding in the slot.

87. Milford, 1,641,499, Sept. 6, 1927. A retread mold includes a curved body having an interiorly polished concave portion with a series of longitudinal alined channels having interconnecting grooves at spaced points along the length thereof to receive and entrap air, means for firmly clamping a tire directly upon the polished concave portion, and means for applying heat to the mold directly to affect the polished concave portion and tire whereby to obtain a relief of the channels and grooves in the tire tread.

88. Gregg, 1,643,493, Sept. 27, 1927. A tire vulcanizer has a tire mold provided with a heat insulating material on the sidewall and bead portion of the mold to prevent overcuring sidewall and bead during vulcanizing.

89. Henson, 1,643,712, Sept. 27, 1927. A tire mold has a supporting rail, mold sections, rollers on one of the sections movably to support the section equipped therewith. The sections have curved inner surfaces to support a tire therein, steam passageways, means for closing the ends of the steam passageway of one of the sections, and means for directing steam to the passageways.

90. Barre, 1,643,869, Sept. 27, 1927. A vulcanizer for repairing tires has a shape retaining member to hold the tire in the mold with the portion thereof not to be repaired out of contact with the mold. The retaining member comprises a plurality of sections, one having a projecting portion fitting into the other, each section having upwardly and inwardly curved sides and an approximately flat top, and means on the sections for securing them together.

91. Wheelock, 1,647,596, Nov. 1, 1927. A vulcanizer has a heated arm with a recess on its underside, a tension bar having a portion adapted to enter the recess, flexible means adapted to hold a tire casing upon the heated arm and engaged over the tension bar, and resilient means adapted to be placed under constant tension to draw the flexible means and the enclosed portion of the tread sidewalls and beads of the casing downwardly and inwardly into close contact with the heated arm.

92. Benaglia, 1,653,835, Dec. 27, 1927. A device for the production of patterns with projecting and depressed portions on the outer surface of rubber tires during retreading comprises a mold, a plate adapted to be inserted into it and having a groove therein, and a flexible band to be inserted into the groove and comprising the pattern to be produced as the tread portion of the tire. The band has a plurality of hinged members at one end which can be removed from and added to the band to vary its length to accommodate any periphery of a tire to be regenerated.

93. Menjou, 1,657,220, Jan. 24, 1928. A retreading mold consists of heating plates and removable tire shaping members, a water bag, and means whereby it is accurately positioned within the mold comprising an annular ring composed of a plurality of arcuate members and provided with a strengthening rib on its inner face and extensible radial arms, provided at their outer ends with heads featuring grooves adapted to engage with the strengthening ribs.

94. Nestler, 1,660,653, Feb. 28, 1928. A tire retread mold includes a pair of sections spaced apart and having recesses in their mold faces at their inner edges, and a strip held in the recesses and having its inner face concentric with the inner faces of the sections and constituting a portion of the mold face.

95. Smith, Caufield, and Peterson, 1,662,035, Mar. 6, 1928. A tire retreading mold comprises a pair of matching circular sections arranged to receive a tire to be retreaded, means for clamping the sections in closed relation around the tire, a resilient pad arranged to fit within the tire, a pair of rings mounted adjacent the sides of the tire, a plurality of levers pivotally connected to the rings, and means for moving the levers to press the sides together and compress the pad within the tire and thereby expand the tread portion of the tire against the inner surface of the mold.

96. Faber, 1,666,998, Apr. 24, 1928. A vulcanizing apparatus has a supporting frame adapted to hold an arcuate hollow mandrel in an axially tilted position for drainage through one end thereof, a set of hollow mandrels of differing diameters, each adapted to be supported by the frame and each having a channel along its underside, a tension bar resiliently supported by the frame in a normal position of entry in the channel of an associated mandrel, and manually operable means for withdrawing the tension bar from the associated mandrel.

97. Henson, 1,668,017, May 1, 1928. A tire retreading mold includes hingedly connected sections, and within them a plurality of independent coils arranged to conform to the shape of a matrix positioned within the casing, and means for supplying steam to the coils in order to heat the matrix.

98. Scott, 1,671,937, May 29, 1928. A tire casing repairing device comprises a table, an arm to support and heat a tire casing, the arm being mounted above the table, vertical members anchored to the table for supporting the arm, a vertically adjustable bar below the arm for tightening a wrapper to be applied about the bar and about the casing on the arm, a yoke attached to the bar and having lugs embracing the vertical members for alining the yoke and bar with the arm, and screw means journaled in the table for actuating yoke and bar.

99. Bell, 1,681,086, Aug. 14, 1928. A vulcanizer comprises a hollow metal block having arcuate projections on the sides concaved longitudinally to provide side molds and having an inwardly extending mold in the top thereof, presser plates movable into the central inwardly extending and the concaved side molds, and means for heating the block.

100. Erikson, 1,681,178, Aug. 21, 1928. In a tire vulcanizing device a combined mold plate and boiler comprises an independent top plate of sheet metal forming a mold, a body portion of sheet metal defining a boiler, and out-turned flanges on the body concentric with the sides of the top plate; the top plate and flanges are rigidly secured together.

101. LaTurner, 1,682,619, Aug. 28, 1928. A vulcanizing device includes a plate having slits extending from the side edges thereof and disposed in spaced relation with each other, the slits at one side of the plate lying between lines extended from the slits at the opposite side of the plate, and a steam pipe secured to the plate to heat it.

102. Burke, 1,690,615, Nov. 6, 1928. A vulcanizer has a base adapted to fit within the beads of a tire casing, a shell of non-stretchable material engageable against the exterior of the assembled casing, interengaging means on the shell and the base for detachably securing them together, and means for expanding the casing from within; the base provides an unobstructed seat for such beads whereby free lateral movement of the latter into contact with the shell is permitted.

103. Burke, 1,700,431, Jan. 29, 1929. Apparatus for vulcanizing together the parts of a tire casing by means of an interposed vulcanizing element includes an electric heating resistance, complementary wooden mold parts conforming to the normal exterior shape of the casing, and means for expanding the latter from within.

(To be continued)

Contributors to Rubber Compounding Progress

Naugatuck Chemical Personnel and Laboratory Facilities

THE formulation of stocks for the manufacture of rubber goods has fallen into two distinct eras: first, the "Art," and second, the "Science" of rubber compounding.

The "Art" Era

The first era covered that span of years from the discovery of vulcanization to well after the turn of the twentieth century. Compounding ingredients were not so numerous, nor were their individual or combined advantages or disadvantages, when mixed and cured with rubber, quite so well understood then as now. Receipts were guarded with great care and secrecy. Few persons were permitted the opportunity to do compounding work or to know what the materials were or what results they were supposed to produce. To be a member of this privileged class was to know the "Art" of compounding rubber, to know the rubber business, and to possess the outstanding qualifications necessary for operating a rubber plant. Even sales representatives of compounding ingredients suppliers knew little or nothing of the use of their materials beyond the fact that quantities were being consumed regularly in various rubber factories.

The "Science" Era

The second era automatically divides itself into 2 stages. Stage one began with the general adoption of scientific departments and research staffs by rubber companies, which resulted in extensive investigations into the chemical and physical properties and behavior of rubber and compounding ingredients; the causes of and methods to resist the rapid deterioration of rubber stocks; the determination of special properties required of rubber compounds for specific purposes, and the means of obtaining or enhancing them to increase the usefulness and the application of rubber products; methods and materials for hastening reactions to increase production and reduce costs; and the designing of testing apparatus and methods for quickly and accurately measuring constituent and product properties for quality control as well as research progress.

An abundance of hitherto unknown scientific facts began replacing rule-of-thumb theories in rubber factory compounding practice and manufacturing processes. Some compounding ingredients fell into disuse because of their injurious effects. Others contained deleterious impurities or foreign materials that the supplier was required to eliminate. New materials were developed to bring about certain advantageous chemical reactions with rubber and other included ingredients. Rigid chemical and physical specifications became an important part of purchasing contracts covering each material.

New Rubber Laboratories Appear

Ingredients manufacturers and suppliers, therefore, faced the necessity of installing rubber laboratories manned with scientists versed in the requirements of the rubber business, yet specialized in the technique of chemical manufacture and development. Thus stage two was automatically ushered into existence. It is distinguished from stage one by the fact that rubber ingredient suppliers assume the initiative in all phases of research directed to the development of new materials, improvement of old ones, and the manner of using all kinds to produce most effective rubber products.

We find this, then, to be truly the era of the Science of rubber compounding. Technicians of the rubber industry have become accustomed to depending on such sources for the best advice regarding rubber compounding practice and progress; while they turn an ever-increasing proportion of their own attention to the sciences of product construction and new applications of rubber in various forms.

Change Not Recognized

So gradual has been this transition of compounding research from the rubber factory to the ingredient maker

EDITOR'S NOTE. The extent to which other chemical manufacturers and suppliers are equipped to make chemical and compounding research contributions to the rubber industry will be amplified by additional articles descriptive of their technical organizations and facilities to appear in future issues of INDIA RUBBER WORLD.

Compounding Research and New Chemical Evaluation Equipment

that few in the rubber industry have paused to consider the astounding extent to which this outside technical aid has grown, or to give quantitative consideration to the vast army of highly trained scientists and the tremendous investment in experimental equipment and working facilities that numerous material manufacturers and suppliers are currently maintaining for the advancement of the knowledge of rubber compounding.

Latex and Dispersions Research and Compounding Laboratory

A Typical Example

Among those prominent in such activities is Naugatuck Chemical. Under slight variations of name it was organized in 1904 to manufacture sulphuric and later other heavy acids. Following its acquisition in 1911 by United States Rubber Co., dye and explosive intermediates and some rubber chemicals were gradually undertaken. In 1923, without departing from the general line of chemicals, plans were effected under the management of E. Roberts, also director of the General Laboratories, United States Rubber Co., to specialize in the development, manufacture, and sale of organic rubber chemicals. Progress was marked by the rapidity with which numerous chemicals, especially fitted to impart new and desirable characteristics to rubber stocks, were developed and accepted by the industry.

Emergency Requirements

Drastic changes in automobile design imposed a need of the radical improvement of resistance to abrasion, flex-cracking, and heat generation of tire assemblies. Automobile engineers sought to remedy the condition by adjusting the steering and wheel attachment mechanism of their cars; tire engineers experimented with tread designs and carcass constructions; and ingredients manufacturers worked on the theory that the new rigid requirements would depend on new chemical compounds. Time has proved that a combination of all of these endeavors was necessary.

Technical Growth

Naugatuck Chemical has continuously enlarged its rubber and chemical research and control facilities as would be required by an annual budget increase of more than 500% since 1927 for technical department operation. More than a quarter of a million dollars investment in the best available experimental equipment and 20,000 square feet of ideal housing facilities, appropriately situated in seven different buildings, provides, briefly, an idea of the size of this scientific institution that contributes progress to the cause of rubber manipulation.

Personnel

M. G. Shepherd, manager of development, directs the several divisions of technical activities conducted in as many laboratories having an operating force totaling 67 persons, 55% of whom are chemists and engineers with college degrees; while the remainder are partly non-technical and partly technically trained men without degrees. In addition seven sound research men, with assisting workers, continuously direct their attention to Naugatuck Chemical problems at the General Laboratories of U. S. Rubber Products, Inc., which are located at Passaic, N. J.

Rubber Chemical Research

The development and evaluation of new rubber chemicals is carried on in the rubber testing laboratories where the work is headed by W. F. Tuley, assisted by W. E. Messer, F. L. Holbrook, H. O. Newman, and nine other technicians of long experience and thorough training in the practical and theoretical phases of rubber compounding and organic chemical preparation. Laboratory rubber working and physical testing equipment for every type of evaluating purpose is available and, wherever of advantage, installed with rubber vibration and noise absorbers.

Aromatic Chemicals

Partly for rubber use, but mainly directed to perfumery production, is the research work conducted in the aromatic laboratory by P. J. Leaper and his three assistants.

Latex and Dispersions Studies

A corps of 17 men, mostly thoroughly trained chemists under the direction of A. E. Barnard, carry on the complicated investigations incident to latex and rubber dispersions which have little known chemical and physical peculiarities. In addition to the continuous quest for an improved understanding of these yet obscure factors, work is addressed to the discovery of latex compounds and methods of compounding and application in the manufacture of rubber products and additional uses in many other industries.

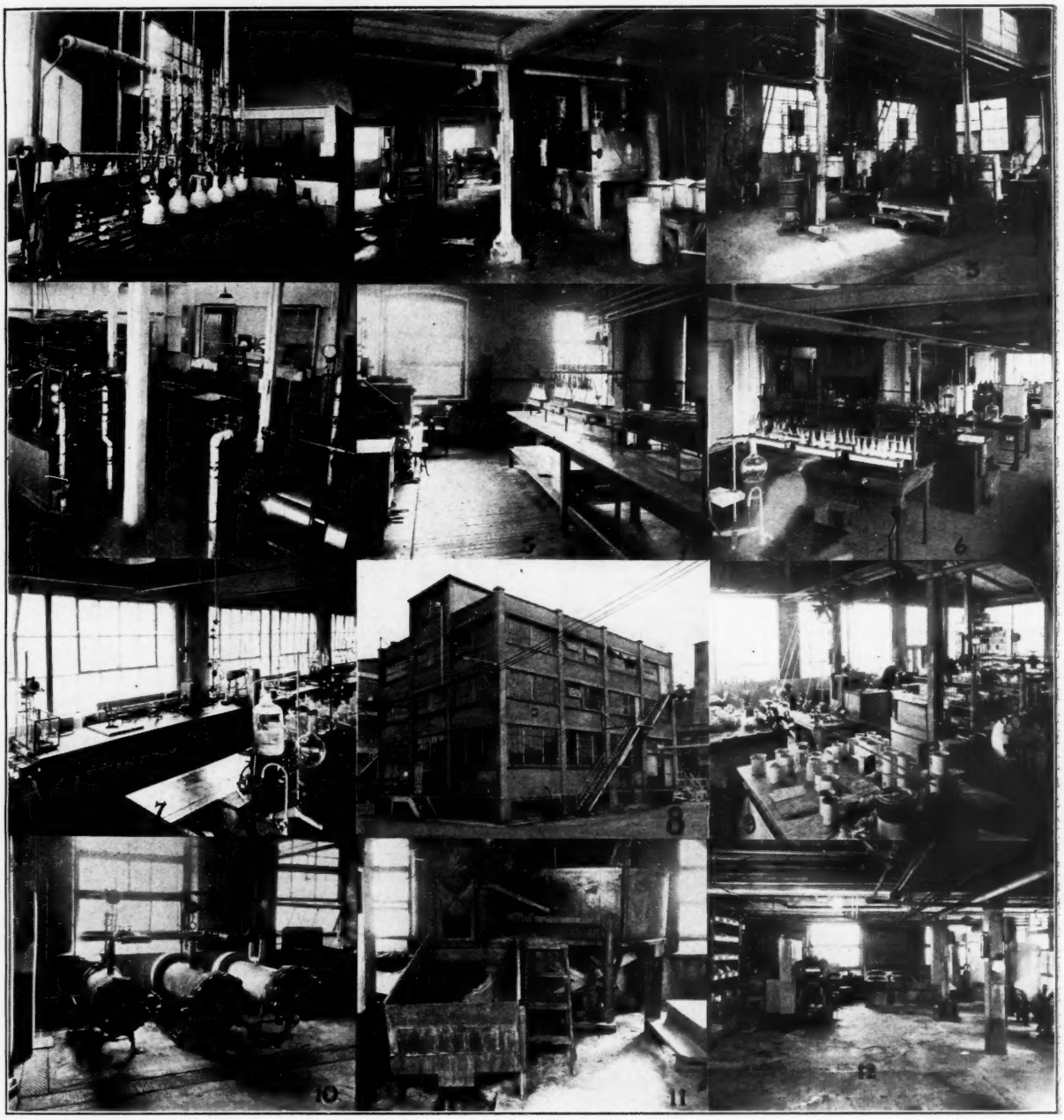
Because of the highly technical nature of the application of latex to industrial use a special department of technical service is maintained for assisting the sales department. This is in charge of A. W. Holmberg, who has been actively engaged in latex compounding since its beginning.

Chemical Process Development

Following the laboratory creation and evaluation and decision to manufacture new chemicals, there arises the necessity of determining the types of equipment and the kind of manufacturing processes for safe and efficient production. This is accomplished under the direction of Ludwig Meuser, whose laboratory facilities consist of all types of apparatus from the delicate kinds of chemical laboratory to the full sized chemical plant equipment with every conceivable appurtenance for obtaining and controlling any desirable processing condition, including special housing to obviate the possibility of disaster in case of explosively violent reactions.

Reclaim Development

W. G. Kirby supervises a staff whose attention is directed exclusively to the development of reclaimed rubber and its applications. The laboratory has chemical, physical testing, and processing divisions. The latter includes



Views from Naugatuck Chemical Laboratories

Figs. 1, 2, 3. Three of the Several Divisions of the Chemical Process Development Laboratory. Figs. 4, 5, 6, 7. Chemical and Physical Divisions of the Control Laboratory. Fig. 8. One of Three Buildings Used Entirely for Laboratory Purposes. Fig. 9. Latex and Dispersions Research Laboratory. Figs. 10, 11, 12. Processing Equipment of the Reclaimed Rubber Development Laboratory.

all types of small-scale equipment with which the various reclaiming processes can be performed experimentally.

Control Laboratory

All finished products of Naugatuck Chemical, and many of them at intermediate stages, are invariably subjected to exacting control tests. Chemical analysis, viscosity, color measurements, optical rotation fineness, etc., are but a few of the operations that are performed by 25 men, approximately half of them trained chemists, under the supervision of D. E. Fowler in a large laboratory suitably equipped for this function.

A Technical Organization

The personnel of the sales and manufacturing departments has been chosen largely from technically trained men of long experience in the problems of the industry to which their respective efforts are directed, thus assuring a mutuality of understanding that makes for the closest type of internal cooperation.

Annals of Rubber[1]

Chronological Record of the Important Events in the History of Rubber

1850. Jonathan T. Trotter made use of zinc hyposulphites in place of free sulphur for vulcanization. The hyposulphites were placed in a solution of caustic lime, potash or other caustic alkali, boiling the flowers of sulphur until the liquor was saturated. Into this liquid passed sulphurous acid gas for the purpose of obtaining a hyposulphite of alkaline base. The liquid was allowed to cool, and the clear portion was decanted into a vessel containing a suitable quantity of a saturated solution of nitrate or other analogous salt of zinc. On mixing these solutions, the zinc was precipitated in a white powder. It was then washed, dried, and subsequently ground in a combination of three pounds of this powder with ten pounds of india rubber heated to a temperature of 260 or 280°.

S. T. Armstrong and C. J. Gilbert used lime or other alkaline substances with heat to neutralize the acid, or acids, contained in gutta percha in its native state. The lime was calculated to improve the quality and preserve it from deterioration and protect it from the atmosphere or heat.

In England, Ernest Werner Siemens, a name which entered largely into the inventive world, patented an improved method of insulation. Wire for underground purposes was coated with a combination of gutta percha and sulphur, the former entirely freed from water, and the latter mixed with it in a very fine powder by means of rollers, and the chemical combination effected by heating the mixture in a steam chamber. This compound has great hardness.

Patents in England were also taken out by foreigners for making "clogs" of india rubber sponge, and also the using of shellac in the manufacture of caoutchouc with or without the application of artificial heat.

1851. Charles Goodyear obtained patents for making hard rubber goods. He treated caoutchouc or gutta percha or a combination of both with sulphur, the whole being mixed at a high temperature, say 300° F. He also introduced into this compound other substances in great variety, both mineral and vegetable, using a masticating machine. Further experiments proved to him that all these foreign compounds were of doubtful utility, and he gradually abandoned them for sulphur alone, making the proportion in its use of one to four. He united this hard rubber to iron and other metals in several different ways.

John Wallace Duncan in England attempted to make engine wheels of gutta percha, by mixing with that gum cannel coal, jintowan, or catimunbo, all ground in a masticator and heated to a temperature of 350°.

Nelson, brother of Charles Goodyear, invented "hard rubber" (vulcanite) and patented it May 6, 1851. He used sulphur with or without shellac for making hard rubber. He also used carbonate or sulphate magnesia, or of lime, with or without shellac for the same purpose.

Horace H. Day made shoes of several parts of different degrees of elasticity, uniting them afterward.

Charles Goodyear exhibited at the Crystal Palace, Sydenham, many products of his skill and invention and received a medal. He is said to have expended $30,000 on this beautiful exhibit.

1852. Infringement suit of Goodyear vs. Day was won by Daniel Webster after eight years of litigation and established the validity of Goodyear's patent on his discovery of vulcanization. Of Mr. Goodyear's right to the sole honor of this great discovery, Judge Grier, of the United States Circuit Court, sitting at Trenton, N. J., in September, 1852, at the close of the memorable trial in which Daniel Webster and Rufus Choate were engaged as opposing counsel, in his decision says:

"It is due to Mr. Goodyear to say, that upon examining the certificate of Professor Silliman, and other evidence in the case, I am entirely satisfied that he is the original inventor of the process of vulcanizing rubber, and that he is not only entitled to the relief which he asks, but to all the merits and benefits of that discovery."

Charles Goodyear, for the purpose of reducing the cost of vulcanization, used coal tar in large quantities, adding it to the combination of caoutchouc and sulphur. He also obtained a patent for the manufacture of combs and gave them an ivory-like texture by gradually heating caoutchouc and sulphur made into sheets to a temperature of 300°, retaining such heat during certain lengths of time. He also obtained patents for making umbrella and parasol sticks by certain defined processes of heating. Another patent suggests the manufacture of gun and pistol stocks, using a compound of two pounds of caoutchouc to one pound of sulphur. His patents at this time show that he preferred no other substances to mix with caoutchouc than sulphur. At this time he seems to have entered the field of insulation, using in this connection caoutchouc, sulphur, gutta percha, and pitch. He formed the compound into sheets, after which it was molded. In molding work he filled up the cores with sand. He sought to manufacture telescopes, picture frames, book covers, etc., harness trapping, furniture; in fact, the list is well-nigh innumerable, taking a base of caoutchouc and sulphur and introducing other substances whenever indispensable to form any individual article.

John Macintosh, England, made packing by using cuttings of vulcanized india rubber, burning them until it made a black and partially fluid product, which is mixed with charcoal, black-lead, and lamp black. He also invented a paint, of decomposed rubber mixed with oils and metallic salts, which would not crack or blister in hot climates.

Charles Weightman Harrison, England, invented an insulator, consisting of caoutchouc dissolved in naphtha with creosote and shellac.

M. Perrot, of the Paris Academy of Sciences, succeeded in making gutta percha as fine as paper, upon which were taken lithographical impressions. It was claimed that gutta percha would allow the reverse of any object to be obtained without redrawing.

(To be continued)

[1] Continued from India Rubber World, May 1, 1935, pp. 36, 38.

Distributers' Tire Stocks

In the United States, April 1, 1935[1]

THIS report covers stocks of tires held by both so-called independent dealers and mass distributers, returns from these two groups being discussed separately below. The survey is made with the support and cooperation of The Rubber Manufacturers Association, Inc.

Independent Dealers' Stocks

The survey of tire stocks in hands of dealers shows the following comparable statistics, as of April 1, for stocks held by independent retailers in 1935 as against 1934. The average number of automobile casings per dealer was 68.2 on April 1, 1935, compared with 79.7 a year ago. The lower number of returns this year results from the fact that in the current survey the dealers circularized were those who reported in the survey of October, 1934, plus a few thousand dealers subsequently added to the mailing list.

DEALERS' STOCKS OF AUTOMOBILE TIRES

	April 1, 1934			April 1, 1935		
	No.	No. of Dealers Reporting	Average per Dealer	No.	No. of Dealers Reporting	Average per Dealer
Total casings	1,677,333	21,043	79.7	878,052	12,873	68.2
High pressure ...	168,138	12,896	13.0	83,341	7,840	10.6
Inner tubes	2,215,665	21,156	104.7	1,133,590	12,891	87.9
Solids	13,962	520	26.9	9,229	278	33.2

An analysis by volume groups has been prepared of the reports from dealers having stocks of casings, and a comparison made to the survey of April 1, 1934. That the representative nature of the returns was not affected by changes in the mailing list is indicated by the close comparability of the volume groups.

DEALERS CLASSIFIED BY VOLUME OF STOCK

	April 1, 1934			April 1, 1935		
	No. of Dealers	% of Total Dealers	No. of Casings	No. of Dealers	% of Total Dealers	No. of Casings
Less than 10.....	4,406	20.94	21,867	2,575	20.00	13,143
10 - 24.....	5,621	26.72	90,428	3,468	26.94	56,039
25 - 49.....	4,464	21.21	156,793	2,861	22.22	101,164
50 - 99.....	3,195	15.18	219,969	2,060	16.00	140,469
100 - 199.....	1,828	8.69	248,319	1,081	8.40	147,661
200 - 299.....	577	2.74	137,498	344	2.67	82,167
300 - 399.....	293	1.39	100,404	178	1.38	60,163
400 - 999.....	488	2.32	289,098	230	1.79	133,751
1,000 and over....	171	0.81	412,957	76	0.60	143,495
	21,043	100.00	1,677,333	12,873	100.00	878,052

The following table compares average stocks per dealer reporting each item on April 1 in the years 1927 to 1935, inclusive.

AVERAGE STOCKS PER DEALER ON APRIL 1

	1927	1928	1929	1930	1931	1932	1933	1934	1935
Total casings...	70.6	81.2	94.4	83.0	78.4	66.2	64.8	79.7	68.2
Balloon casings.	35.5	45.7	69.1	*	*	*	*	*	*
High pressure..	*	*	*	22.4	15.6	12.1	11.3	13.0	10.6
Inner tubes	120.9	123.4	143.5	118.6	106.5	90.7	82.6	104.7	87.9
Solids, etc.	24.7	27.0	35.0	28.4	21.8	17.8	18.5	26.9	33.2

*Not tabulated separately.

Since 1930 the percentages of dealers handling one, two, three, and four makes of tires have not changed materially.

[1] Special Circular No. 3,570, Rubber Section, Department of Commerce, Bureau of Foreign and Domestic Commerce, Washington, D. C.

NUMBER OF MAKES HANDLED BY DEALERS
(Percentages of Total)

No. of Makes:	1927	1928	1929	1930	1931	1932	1933	1934	1935
One	47.9	54.2	58.5	68.3	70.0	71.5	70.8	69.7	69.0
Two	37.5	33.0	30.7	24.9	24.0	23.6	24.0	24.3	25.0
Three	10.3	9.0	7.3	4.7	4.1	3.6	3.9	4.4	4.3
Four, Five, and Six....	4.3	3.8	3.5	2.1	1.9	1.3	1.3	1.6	1.7
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

In the last three April 1 surveys dealers were asked the following questions: Do you have equipment for vulcanizing passenger car tires? Do you have equipment for vulcanizing truck tires?

	Vulcanizing Equipment for Passenger Car Tires			Vulcanizing Equipment for Motor Truck Tires		
	1933	1934	1935	1933	1934	1935
Affirmative	3,071	2,700	1,509	1,519	1,392	726
Negative	18,158	17,818	11,485	19,306	19,273	12,017
No reply	759	1,451	357	1,163	1,304	608
Total	21,988	21,969	13,351	21,988	21,969	13,351
% Affirmative..	13.97	12.29	11.30	6.91	6.34	5.44

Analysis of Tire Dealers by Types of Business

The following specific questions were asked of all dealers reporting: Do you sell automobiles? Do you sell gasoline? Do you sell batteries? The following is a statement of the replies in the last three April surveys.

	April 1, 1933		April 1, 1934		April 1, 1935	
	No.	% of Total	No.	% of Total	No.	% of Total
Total Reports Received	21,988	100.0	21,969	100.0	13,351	100.0
Sell automobiles.	7,000	31.8	6,682	30.4	4,266	32.0
Sell gasoline....	15,964	72.6	15,888	72.3	10,038	75.2
Sell batteries ...	14,719	66.9	14,708	66.9	9,373	70.2

Small Mass Distributers' Stocks

An interesting sidelight on tire distribution is afforded from analysis of reports received from 155 distributers, circularized with the mass distributer questionnaire, indicating the jumbled retail-wholesale functions often performed even by relatively small distributers. These firms were originally listed as distributers through oil company filling stations, but many of them would be more properly classified as ordinary tire dealers. Note that distributers stocking 301-500 casings serve about 10 outlets each; 501-1,000 casings about 20 outlets each; 1,001-2,000 casings about 25 outlets each; and 2,001-5,000 casings about 160 outlets each, on the average, according to the following tabulation of reports received. Whether the stocks reported by these distributers include stocks held by sub-dealers is not certain; in many cases, sub-dealers' stocks were probably not included.

Groups by Casings in Stock	No. of Distributers	Sub-Dealers Reported by	Sub-Dealers Retail Outlets	Distributers' Stocks Casings	Distributers' Stocks Tubes	Average Casings per Distributer
Under 51	22	8	52	642	1,166	29
51 - 100.....	21	10	80	1,635	2,675	78
101 - 200.....	29	20	155	4,474	6,364	154
201 - 300.....	15	12	109	3,656	4,177	244
301 - 500.....	23	18	189	8,609	10,169	374
501 - 1,000.....	18	18	355	11,115	14,609	618
1,001 - 2,000.....	13	13	318	18,109	25,185	1,393
2,001 - 5,000.....	14	13	2,117	48,157	50,361	3,440
	155	112	3,375	96,397	114,706	622

Large Mass Distributers' Stocks

In the current survey an attempt was made to secure more complete information than formerly concerning stocks of tires held by so-called oil company distributers. With the cooperation of tire manufacturers a list of companies distributing tires through chains of filling stations was made up and was circularized. Besides the reports received as described in the preceding paragraph, reports were received from 18 large distributers in this group, handling either private brand or company brand tires, and reporting information as shown below. Whether stocks held in retail outlets were reported is somewhat uncertain, although the questionnaire called for such stocks.

Reports Received	Stations Served	Casings on Hand	Tubes on Hand	Solids on Hand
18	49,104	1,274,686	1,170,333	15

The usual survey of stocks held in chain stores operated by six tire manufacturing companies, and both wholesale and retail stocks held by two mail order houses and two independent chain store distributers, shows:

Reports Received	Retail Stores	Casings on Hand	Tubes on Hand	Solids on Hand
10	2,760	1,557,441	1,344,305	3,730

Summary

The purpose of these surveys is to enable estimates to be made periodically of the total stocks in hands of distributers. Owing to changes introduced in the survey, results are shown here in somewhat different form from previous surveys. While the percentage of completeness of reports received from the groups reporting to us is not definitely known, it is believed that estimates of a tentative nature may be helpful.

Dealers classified as "independent dealers" would include many small dealers handling tires as sub-dealers of other wholesalers as well as the direct dealer outlets of tire manufacturers. Their number is very large; their *average* stock is doubtless small, but in the aggregate of great importance. It is believed that stocks reported by the independent dealers in this survey may represent no more than 20% of the total for such stocks.

The "small mass distributers" classification is a new one. There was approximately a 28% return on the mailing list used. This mailing list was incomplete; on the other hand some of those reporting were really ordinary tire dealers. The percentage of completeness here may be around 25%.

The returns from large companies which distribute through oil company filling stations were much more complete than formerly. There are several important distributers who did not submit reports; on the other hand those which did report were, on an average, much more important than the others. The stocks reported under this head may represent 80% of the total.

The returns from tire company chains were exclusive of only one fairly important operator. Other tire companies which did not report operate only a few stores. One independent chain reported stocks held by only one of its two national sub-divisions. Total stocks reported under this group would be about 90% complete.

The following statement shows the result of applying these percentages to the reported figures, but is to be regarded as indicative rather than necessarily accurate. Figures are in thousands.

		Tires	Tubes
Dealers	20%	4,390	5,667
Small distributers	25%	385	459
Oil distributers	80%	1,593	1,464
Chain stores	90%	1,731	1,493
Total		8,099	9,083

The tentative estimates of distributers' stocks as of April 1 for previous years, incorporated in circular 3,526, were as follows:

	Thousands of Casings		
	April, 1932	April, 1933	April, 1934
Independent dealers	4,634	4,536	5,579
Mass distributers	1,900	1,815	2,140
	6,534	6,351	7,719

Modern Rubber Research

(*Continued from page* 31)

The preservation of latex for shipment has long left the experimental stage although Ceylon has so far had little experience in this branch of the industry. The industrial applications of latex are now so extensive that it seems unlikely that Ceylon estates will remain outside this field of activity. It is one of the aims of the Research Scheme to be in a position to give estates practical assistance in the technique of latex preservation; and to this end an ammoniating tank has been installed at the Dartonfield factory, together with a latex storage tank and an arrangement for emptying it by means of compressed air. It is also probable that a latex centrifuge will be installed for producing concentrated latex during the year for experimental purposes.

The purely experimental side of the factory is equipped with a small-scale manufacturing and vulcanizing plant for testing the processing properties of raw rubber and for investigating the possibilities of the local production of manufactured goods. The equipment consists of a masticating and mixing mill, a 3-bowl calender, an extruding machine for producing rubber in continuous lengths, a spreading machine for coating fabrics, a steam vulcanizer, and a small steam-heated vulcanizing press.

A 3-story drying building is divided centrally so that one half is used as a smokehouse and the other as a crepe drying house. The crepe drying room is heated to about 90 to 95° F. with a hot water radiator to eliminate trouble with mold in wet weather.

The laboratory building, which includes the estate superintendent's and chemist's offices, is equipped for general chemical work with particular reference to the physical and chemical examination of raw and vulcanized rubber. Gas for the laboratory burners is produced by a petrol-gas plant.

For testing raw and vulcanized rubber several specially designed pieces of apparatus have been installed. There is a test which serves to give an indication of the aging properties of vulcanized rubber. The samples are heated for several days in air at a controlled temperature, and the progress of deterioration is followed by determining from time to time the tensile strength. The stress-strain characteristics and tensile strength of the samples are measured by means of an electrically operated dynamometer.

In another test the deformation of raw rubber under a standard weight is accurately measured and taken as a measure of plasticity, a property of great importance to the manufacturer. The viscosity of rubber latex is another variable property for the study of which provision has been made.

It will thus be seen that the factory and laboratory at Dartonfield together form a complete unit for the extension of work on the utilization of rubber. The provision of these facilities may be taken as an indication of the importance which the board of the Rubber Research Scheme attaches to this type of work.

Hard Rubber (Ebonite)[1]

A. R. Kemp and F. S. Malm[2]

THE following concludes the interesting and enlightening article on hard rubber (ebonite) begun in our May issue.

Compounding

Pure rubber-sulphur mixtures produce excellent hard rubber for some purposes. However the requirements of factory processing and varied uses are such as to make desirable the addition of various compounding ingredients to meet specific needs.

TABLE I. EFFECT OF HARD RUBBER DUST ON IMPACT STRENGTH[3]

Compound*			
Rubber %	Sulphur %	Hard Rubber Dust† %	Impact Strength (Izod)‡ Cm.-Kg.
70.0	30.0	None	3.46
66.5	28.5	5	2.81
63.0	27.0	10	2.81
59.5	25.5	15	2.77
56.0	24.0	20	2.77
52.5	22.5	25	2.81
49.0	21.0	30	2.77

*Vulcanization: 4-hour rise to 149° C., 12 hours at 149°.
†50-mesh dust from high-quality scrap.
‡1.27-cm. specimen.

Hard rubber dust[4] is used either alone, as in dust press molding, or in new mixtures. It facilitates mixing and milling operations and reduces excess shrinkage in the manufacture of rods, tubes, sheets, and molded parts. With the use of dust the possibility of "blowing" during cure is greatly reduced.[5] Hard rubber dust from low gravity, bright fracture, clean hard rubber scrap can be used with comparatively little deleterious effect on physical properties as compared with mineral fillers.[6] Ground hard rubber in 40-mesh and finer sizes is used up to equal volumes on the rubber; in special cases even higher percentages are used. The effect of hard rubber dust addition on impact strength is shown in Table I.

Reclaimed rubber is widely used in the manufacture of many hard rubber articles since its use aids factory processing and effects economies in compounding. The addition of reclaimed rubber is a valuable aid in reducing excessive internal temperature rise during vulcanization. The effect of reclaimed rubber on the impact strength of hard rubber is shown in Table II.

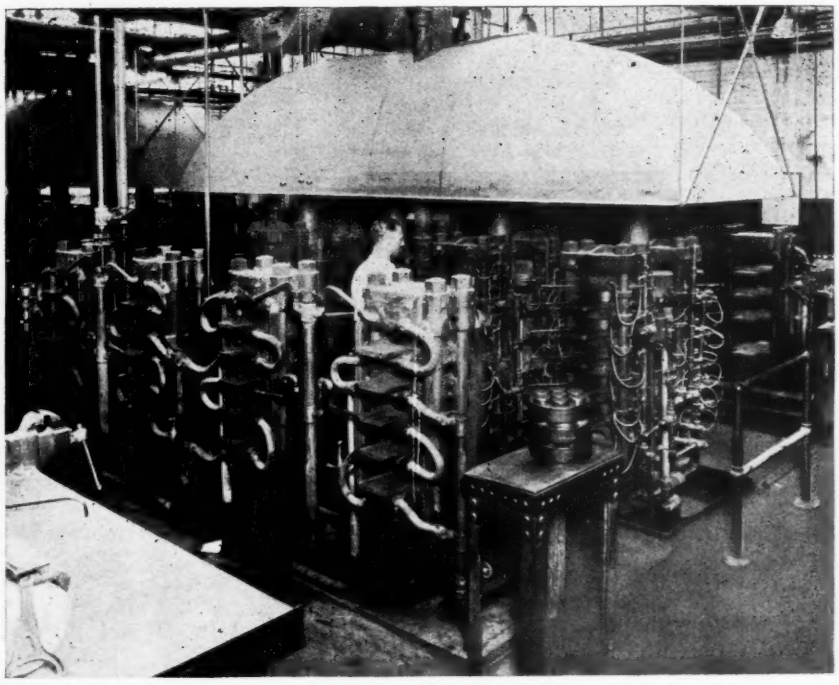
TABLE II. EFFECT OF RECLAIMED RUBBER ON IMPACT STRENGTH[3]

Compound*			
Rubber Parts	Sulphur Parts	Reclaimed† Parts	Impact Strength (Izod)‡ Cm.-Kg.
70	30	None	3.46
60	30	11.6	3.46
50	30	22.2	3.60
40	30	34.8	3.27
30	30	46.4	3.05
20	30	58.0	3.19

*Vulcanization: 4-hour rise to 149° C., 12 hours at 149°.
†Floating reclaim of 85% rubber content.
‡1.27-cm. specimen.

Such materials as oil substitutes, mineral rubber, waxes, and vegetable oils are frequently added to hard rubber mixings to obtain desired working properties. Additions, however, beyond a few per cent result in an objectionable reduction in the hardness of the final product. Table III shows the effect on cold flow and impact strength of adding 3% of various commercial softeners to a 68-32 rubber-sulphur mixture vulcanized 12 hours at 150°. The method of test appears later under physical properties.

Lime and magnesia are sometimes used in small quantities to accelerate the vulcanization of hard rubber. There appears to be very little difference in the accelerating action of these materials on a volume basis as shown by Glancy.[7] Light-calcined magnesia is, however, most commonly used. Davies[8] has shown that the accelerating action of magnesium carbonate is very similar



Hard Rubber Dust Molding Presses

[1] Reprinted from *Ind. Eng. Chem.*, Feb., 1935, pp. 141-46. Paper presented before the Division of Rubber Chemistry at the eighty-seventh meeting of the A. C. S., St. Petersburg, Fla., Mar. 25 to 30, 1934.
[2] Bell Telephone Laboratories, New York, N. Y.
[3] Bell Telephone Lab., unpublished work.
[4] Bath, *India Rubber J.*, 79, 935 (1930); 80, 67 (1930).
[5] Riding, *Trans. Inst. Rubber Ind.*, 6, 230 (1930).
[6] Pearsall, INDIA RUBBER WORLD, 77, 70 (1927).
[7] Glancy, *Ind. Eng. Chem.*, 16, 359 (1924).
[8] Davies, *Trans. Inst. Rubber Ind.*, 10, 176 (1934).

in magnitude to that exhibited by organic accelerators.

TABLE III. EFFECT OF SOFTENERS ON IMPACT STRENGTH AND COLD FLOW

Softener	Impact Strength (Izod)* Cm.-Kg.	Cold Flow† Mm.
None	2.44	0.04
Zinc laurate	2.23	0.13
Hydrocarbon	2.08	0.71
Rosin oil	2.08	0.15
Raw linseed oil	2.23	0.14
Composition‡		%
Smoked sheet rubber		53.00
Sulphur		25.00
Hard rubber dust		19.00
Softener		3.00
		100.00

*1.27-cm. specimen.
†281 kg. per sq. cm.; 1.27-cm. specimen.
‡Vulcanization; 4-hour rise to 149° C., 12 hours at 149°.

Fillers such as barytes, whiting, and clay are widely used to obtain greater hardness and heat resistance and for economy.

In producing colored hard rubber there is the obvious difficulty of covering up its natural brownish-black color, which involves the use of a large proportion of coloring agents. The chemical reaction of the sulphur with the pigment must also be considered. This inherent dark color is usually covered by adding a white pigment such as lithopone or zinc sulphide. The sulphides of zinc, mercury, cadmium, and antimony are frequently employed as pigments in hard rubber.

In recent years considerable effort has been made to take advantage of the high tinctorial power of organic lake colors in hard rubber with promising results.[9, 10]

Physical and Mechanical Properties

As sulphur combines chemically with the rubber hydrocarbon, the density increases to a maximum corresponding to the full saturation of the double bonds. Curtis, McPherson, and Scott[11] determined the density of rubber-sulphur compounds at 25° C. over the complete range between soft rubber and fully vulcanized hard rubber.

Some commercial uses of hard rubber require that the material shall offer high resistance to distortion under compression strains at temperatures up to 49° C. A suitable test for this property involves subjecting a 1.27-cm. cube of the material to a constant pressure of 281 kg. per sq. cm. at a constant temperature of 49° C. and measuring the deformation with a micrometer after 24 hours. Fully cured hard rubber free from softeners has a high resistance to deformation. Table IV shows the effect of combined sulphur on physical properties of hard rubber. Addition of mineral fillers decreases this flow as would be expected; while softeners tend to increase cold flow.

TABLE IV. EFFECT OF COMBINED SULPHUR ON PHYSICAL PROPERTIES OF HARD RUBBER*

Composition* Rubber %	Sulphur %	Cold Flow Mm.	Izod Impact Strength Cm. Kg.	Transverse Strength Kg./Sq. Cm.	Combined Sulphur %	Density at 25° C.
72	28	0.12	4.0	975	27.6	1.131
70	30	0.15	4.0	1000	29.2	1.146
68	32	0.09	3.9	1050	30.4	1.163
65	35	0.12	3.7	1095	31.8	1.183

*Vulcanization: 4-hour rise to 149° C., 16 hours at 149°.

Frequently it is desirable to determine the hardness of hard rubber compositions at various temperatures. For this purpose the use of many different instruments has been proposed, but no definite testing procedure has been adopted. The durometer is a suitable instrument for rapid tests and has been employed[12] for tests at 100°. Davies[5] has investigated durometer measurements on hard rubber over the range of 10° to 50° C. The hardness, like the resistance to flow under compression, is greatest with the highest cure. The addition of fillers (inorganic), such as whiting, aluminum powder, and barytes, increases the hardness as would be expected; addition of softeners has the opposite effect.

One of the most valuable tests for determining the tendency of a material to break on being subjected to sudden shock is the impact resistance test. Special machines have been made for this purpose. The Izod and Charpy types of impact testers are most widely used and have been described by Werring.[13] The test involves notching a 1.27-cm. square bar of hard rubber, placing it in the jaws of the machine, and striking it with a weighted pendulum. Tables I, II, III, and IV show the effect of hard rubber dust, reclaimed rubber, softeners, and combined sulphur on impact strength. Additions of mineral fillers beyond a few per cent on the rubber reduce the impact strength of hard rubber.

Hard rubber varies in tensile strength and elongation, depending on its degree of vulcanization and composition. Its tensile strength ranges from about 300 to 775 kg. per sq. cm., the higher value being obtained for completely vulcanized ebonite. Glancy[7] studied the variation of tensile strength and elongation with combined sulphur in the case of various rubber-sulphur mixtures vulcanized at 170°. Compounding generally results in a reduction in tensile strength associated with either an increase or a decrease in elongation, depending on the type of compounding ingredient. Pearsall[6] found that the elongation of hard rubber is approximately 20% at a vulcanization coefficient of 25 and decreases to 2% at a coefficient of 45. Davies[14] has studied the stress-strain relationship in hard rubber as affected by variation in composition and state of cure.

The transverse breaking strength of hard rubber is not very critical as regards showing the effect of variations in composition. Various means are used for measuring this property.[5] The most common method is probably that of supporting a 1.27 by 1.27 by 12.7 cm. bar of the material on knife edges 10.2 cm. apart and applying a given load in a transverse direction to the center of the bar and testing at about 21° C. Table IV gives values for transverse strength of various hard rubber compositions.

Electrical Properties

Hard rubber in the pure state has a dielectric constant at 1,000 cycles and 25° C. ranging from 2.7 to 3.0.[11] The exact value depends on the state of cure, amount of free sulphur, and purity of the rubber. Addition of fillers and pigments, especially carbon black, increases the dielectric constant. The effect of temperature is quite marked,[15, 16] the dielectric constant increasing some 50% between 65° and 145° C. The dielectric constant at 1,000 cycles and 25° C. rises rapidly to a maximum value at a point between 12 and 15% combined sulphur.[11, 15-18] These maximum values are shifted to correspond with other sulphur-rubber ratios as a result of changes in the temperature or frequency of measurement.[15, 16]

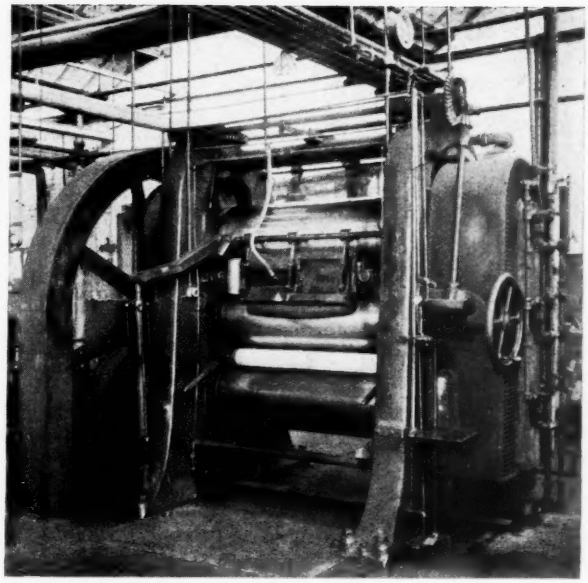
The power factor of ebonite at 60 to 3,000 cycles ranges between 0.3 to 0.8% at 25° C. At 300,000 cycles the values range between 0.7 to 0.9. The power factor at 25° C. and 1,000 to 3,000 cycles, when plotted against vulcanization coefficient over the whole rubber-sulphur range, shows peak values of 7 to 8%. The maximum values lie between vulcanization coefficients of 13 and 17.[11, 15, 17-19] Both temperature and frequency shift the position of this peak value on the curve for percentage combined sulphur vs. power factor.[15, 16] The power factor of pure hard

[9] Morgan, INDIA RUBBER WORLD, 88, 39 (1933).
[10] Naunton, *Trans. Inst. Rubber Ind.*, 4, 68 (1928).
[11] Curtis, McPherson, and Scott, Bur. Standards, *Sci. Paper* 560 (1927).
[12] *Vanderbilt News*, 3, 4 (1933).
[13] Werring, *Proc. Am. Soc. Testing Materials*, 26, 634 (1926).
[14] Davies, *Trans. Inst. Rubber Ind.*, 9, 130 (1933).
[15] Kitchin, *Ind. Eng. Chem.*, 24, 549 (1932).
[16] Scott, McPherson, and Curtis, *Bur. Standards J. Research*, 11, 173 (1933).
[17] Kemp, U. S. patent No. 1,656,737 (1928).
[18] Kimura, Aizawa, Takeuchi, *J. Inst. Elec. Engrs.* (Japan), 1928, 1274-77.
[19] Midgley, Henne, and Shepard, *J. Am. Chem. Soc.*, 54, 2953 (1932).

rubber is generally increased by additions of other ingredients.

Plotting volume resistivity (ohm-cm.) against combined sulphur content shows a steady increase with an abrupt rise to a peak occurring between 20 and 30%, then sharply decreasing at 32% sulphur. The resistivity of hard rubber having vulcanization coefficients between 25 and 43 is 1 by 10^{16} to 3 by 10^{16} ohm-cm.[11]

Hard rubber possesses a high dielectric strength. The value for ebonite ranges between 100,000 and 150,000 volts per mm., depending on the particular composition.[20] Commercial grades of filled hard rubber are generally lower than ebonite in dielectric strength.[5]



Calendering Compound for Hard Rubber Sheet

TABLE V. EFFECT OF MOISTURE ON ELECTRICAL PROPERTIES OF HARD RUBBER[3]

Material*	Moisture Absorbed %	Time of Immersion Days	Specific Inductive Capacity† Dry	Specific Inductive Capacity† Wet	Specific Resistivity Dry Ohm-Cm.	Specific Resistivity Wet × 10^{-15}	Power Factor† Dry %	Power Factor† Wet %
Ebonite (75-25)	0.28	315	2.8	2.9	20	10	0.8	0.9
Ebonite (70-30)	0.23	315	2.9	3.0	20	10	0.8	0.6
Hard rubber‡	1.56	315	3.0	4.0	20	8	1.3	1.4

*Sheets 1 mm. thick immersed in distilled water.
†Test conditions: 1,000 cycles per second and 25° C.
‡Composition of hard rubber: smoked sheets, 26.5; reclaimed rubber, 18.5; sulphur, 15.0; paraffin, 2.0; hard rubber dust, 35.0; mineral rubber, 2.0; carbon black, 0.5; and magnesia, 0.5 (total, 100).

When thin sheets of hard rubber are soaked in water for very long periods, equilibrium is approached, and the absorption of water slows down to an undetectable rate. The ultimate amount of water absorbed varies with the composition of the hard rubber as can be seen in Table V. In the case of ebonite mixtures this water absorption does not affect the appearance of the material or seriously affect its electrical properties. Table V gives the water absorption of hard rubber when immersed for long periods in distilled water and its effect on electrical properties.

Schumacher and Ferguson[21] showed that moisture diffuses somewhat slower through hard than through soft rubber. They studied the rates of diffusion of various rubber compositions and found that the rate does not vary much with composition. Recently Herrmann[22] has determined the rate for various hard rubbers and obtained an average value of 1.5 by 10^{-8} gram per sq. cm. per hour per mm. of mercury when measuring the loss of weight in a cell with water as well as salt solutions on one side of the hard rubber diaphragm and P_2O_5 on the other. The effective diameter of the cell used was 4 cm., and the specimen thickness was 15 to 20 mils.

[20] Patterson, Rayner, and Kinnes, *J. Inst. Elec. Engrs.* (London), 50, 254 (1913); *India Rubber J.*, 62, 27 (1913).
[21] Schumacher and Ferguson, *Ind. Eng. Chem.*, 21, 158 (1929).
[22] Herrmann, *Bell Lab. Record*, 13, 45 (1934).

Para-Graphs

LATEX DIPPING. In this process a portion of a given volume of latex is exposed to the direct action of a small body of a dehydrant without intermingling the two substances, thus removing a portion of the water from the latex in the immediate vicinity of the dehydrant. A variety of dehydrants may be used, all of which are of an organic colloidal nature and capable of being swollen only in considerable water to form viscous or gelatinous aqueous solutions which lend themselves to deposition as a smooth layer of uniform thickness on molds. The essential feature of the method pertaining to the making of dipped goods is the initial application of a dehydrant either in the form of a powder or solution to a suitable form and then immersing the form into a latex bath and repeating the process until the desired thickness of latex has been built upon it. The method is applicable to natural latex properly preserved or an artificial dispersion. It may be either vulcanized or unvulcanized, concentrated or unconcentrated, and may or may not contain vulcanizing ingredients and other compounding ingredients.

ACCELERATORS AND ANTIOXIDANTS. The output of the rubber industry has been increased enormously by the use of vulcanization accelerators, saving the rubber factories an estimated additional capital investment of $50,000,000 and yielding improved products. Other ingredients, antioxidants, have added greatly to the life of rubber tires.

DIPPED SHOE UPPERS. These are of utility in the manufacture of footwear having an exterior surface of rubber formed with a design in relief simulating natural leathers such as alligator, snake, etc. The design is obtained from a shoe upper made up in natural leathers, and its photograph is etched on to a sheet of zinc which is subsequently shaped and soldered into a conoidal form. Its large end is closed by a sheet of metal, and a clip at the small end serves to hold it suspended during the dipping process. The form is repeatedly dipped into latex or artificial dispersion of rubber that includes suitable pigment, sulphur, and accelerator for subsequently effecting vulcanization. The shoe lining is mounted on the rubber deposit while the latter is still on the form. The lateral margins of the lining are joined in a lapped seam. When thus assembled, the coating and lining may be stripped as a unit from the form being turned or reversed by the operation so that the lining is innermost and the rubber coating is outermost and together constitute a shoe upper ready to be built into an overshoe in the usual manner and subsequently vulcanized in dry heat.

EDITORIALS

The Growing Use of Latex

CHEMISTS have been intrigued with the mysteries of latex over a long span of years. During the last fifteen years intensive research has produced a wealth of enlightenment that has been turned to an ever-increasing number of applications. The simplicity of processes and equipment required for manufacturing products from latex, as well as the many improved characteristics of such products, are points of commanding significance to rubber manufacturers.

The use of latex in manufacturing rubber products is in but the earliest stage of infancy; yet the trend of progress is interesting. The United States annual imports averaged 3,133 long tons (dry rubber weight) during the five-year period ending 1929; 4,727 long tons during the three years ending 1932; while 1933 imports increased to 11,085 long tons, and those of 1934 to 13,070.

These data bring to mind Prof. Ernst A. Hauser's prediction that latex will rapidly displace the use of dry rubber with attendant reduction of costs, improvement of quality and appearance, and entry into fields heretofore closed to rubber when the technologists of the rubber industry concentrate their collective attention to the methods of use and control of natural liquid rubber.

Texas Gas Conservation and Carbon Black

THERE is apparently no basis for apprehension that the carbon black supply or quality will be impaired because of the recently enacted law by the Texas state legislature to conserve the natural gas resources in the Panhandle district. Among other protective provisions sweet gas, a natural gas containing a minimum of corrosive hydrogen sulphide, is prohibited for use in the manufacture of carbon black. Two prevalent kinds, sour gas and casinghead, can be used for this purpose provided the gasolene content is extracted and conserved according to regulations. Sour gas is a natural gas containing sulphur compounds and hydrogen sulphide in excess of a specified maximum characteristic of sweet gas and is not suited to lighting or heating purposes because of the detrimental effect of these reactive impurities to pipe lines, burner mechanism, and health; while casinghead is a gas associated with the sources of crude oil and is not suited to pipe line uses because of its pressureless occurrence.

Carbon black can be made of sweet gas with less equipment provisions than becomes necessary with sour gas, and during the past in the absence of prohibitive restrictions carbon black manufacturers have utilized sweet gas preferentially. The matter of legislative conservation of natural resources including natural gas is not a new subject; or was the direction it has taken in the new law of an unsuspected nature to carbon black interests. The manner of suitably treating sour gas and the mechanical means of satisfactorily employing its use to make carbon black of proper quality and in the necessary volume are already well known and as a matter of fact have been proved by regular manufacturing practice. The law does not become effective until August 1, 1935, thereby allowing ample time for all necessary plant adjustments to be installed for conversion of the permissible grades of gas into carbon black.

Rubber Producer-Manufacturer Contact

ADMITTEDLY there has been improvement in the physical condition and the curing characteristics of standard plantation grades of crude rubber in years past; yet neither the degree of that progress nor the rapidity of it has been in the proportion that should be expected when one considers the amount and the persistency of effort continuously expended by technologists of the rubber industry in the United States in spotting the unsatisfactory conditions and revealing their disadvantages from the manufacturer's viewpoint. Much of the effectiveness of that effort has been currently lost, seemingly, through the medium of transmission to the producer.

The remedy for this waste obviously resides in the improved understanding, each of the other's requirements and handicaps, that can be realized only through a more direct producer-manufacturer contact and cooperation.

The recent visit of Edgar Rhodes, Ph.D., chief chemist of the Rubber Research Institute laboratory at Kuala Lumpur, F. M. S., to the United States resulted in the appointment of a crude rubber committee to contact directly with technical agencies of producers, is a matter of deep seated importance. Likewise Rubber Research Scheme's recent opening of a 178-acre-estate experimental station in Ceylon with facilities for investigating the problems of both producers and manufacturers is a notable move in the direction of welding the two phases into a single problem. Finally the direct influence of rubber goods manufacturers, rapidly growing in the midst of producers in Malaya, Netherland India, Ceylon, British India, and the Philippines, will inevitably result in improved crude rubber conditions that will benefit distant as well as neighboring manufacturers.

What the Rubber Chemists Are Doing

A. C. S. Activities

Chicago Group

THE annual spring meeting of the Chicago Group, Rubber Division, A.C.S., held May 10 in the College Inn and the Crystal Room of the Hotel Sherman drew a larger attendance than had any previous meeting of the group. H. A. Winkelmann, of the Marbo Corp., gave an illustrated talk on "A New Method for Compression Tests" and gave data showing tests on all of the pigments commonly used in the rubber industry.

The noted hunter, J. C. Nichols, followed with a short talk on hunting in Alaska and introduced Dr. Frederick Cook, Arctic explorer, who spoke briefly on Alaska and the far north.

Boston Group

THE spring meeting of the Boston Group, Rubber Division, A. C. S., held May 17 at the University Club was attended by about 130 members and guests. The lecture on "Strange Patents," by Peter Pinto, editor of *The Rubber Age*, New York, N. Y., was illustrated by lantern slides and occasioned much interest and amusement on the part of the audience. The serious portion of the program consisted of the following.

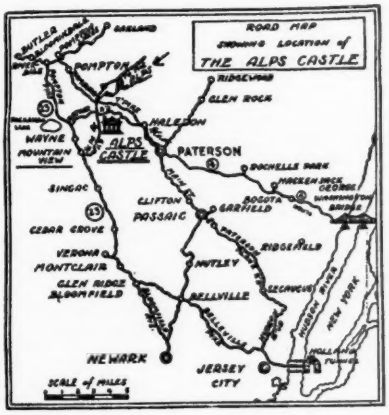
Charles E. Maynard, factory manager, The Fisk Rubber Co., Chicopee Falls, Mass., in a paper entitled "Machine and Process Development" discussed the various phases of his subject such as its value as plant investment insurance as reflected in production cost reductions, improvement in quality, and origination of new products. Practical experience in machine and process development reveals that the person engaged in this sort of work should possess marked inventive ability, imagination, and fixed untiring determination to carry through his studies and experiments to a successful conclusion. These natural traits should be supplemented by scientific training and familiarity with labor-motion study, both of which are virtually indispensable for analysis of development problems. The development engineer must guard against any restraining effect of his previous training and analyze his problems with an open mind and with freshly sought data. In the matter of procedure it is good practice to start with comparisons of operating costs based on time study and labor analysis to determine the possible economies and the worthwhile value of any project. Detailed records of the work must be kept and progress be summarized in the reports essential as sources of constructive suggestions. Frequently practical suggestions that make an otherwise lagging development into a concrete working machine or process can best be attained by referring that feature to a person of practical experience in making new ideas operative.

Chemical and mechanical development are both characterized by two types: namely, research and routine development. Research is the more expensive and basic to progress; while routine development is a matter of steadily making minor changes and economies to reduce production costs.

Machine and process development in its broader aspects contributes to general social well being by making available new, better, and cheaper products and the inevitable increase of employment incidental to their production.

New York Group

THE New York Group, Rubber Division, A. C. S., will hold its second annual outing Saturday, June 15, at The Alps Castle, Alps Road, Preakness, Paterson, N. J. The day's events, starting at 9:00 a. m., will include a soft ball contest, golf, boochie, tennis, swimming, boxing, lunch, and dinner. Many prizes will be awarded, including a trophy to be donated by INDIA RUBBER WORLD, to the winning team of the soft ball contest. This team will be awarded custody of the trophy for one year. Any team winning this prize three times gets permanent possession of the cup. Tickets at $2.50 a person ($1.50 extra for green fee for golf) may be procured from William M. Morse, c/o INDIA RUBBER WORLD, 420 Lexington Ave., New York, N. Y.



Directions for reaching The Alps Castle follow. Those coming from Newark, Montclair, and the Oranges, turn right from the Newark-Pompton Turnpike just after crossing the Lackawanna Railroad at Mountain View. Thus, if you come from the Holland Tunnel, take Route 23 to Mountain View and turn as indicated. Those coming through Paterson - Haledon, take Hamburgh Turnpike to the first left turn past the Preakness Airport. Thus, if you come over the George Washington Bridge, follow Route 4 to Paterson and continue as indicated. From North Jersey or Preakness Hills Country Club, take Ratzer Road to the meeting point with Alps Road and turn left. Arrangements will be made to meet various trains in Paterson so that members coming by railroad can reach the place.

The New York Group will hold its fall meeting October 11 at the Building Trades Employers' Association clubrooms, 2 Park Ave., New York, N. Y. The Society of Rheology, which will have its fall meeting in New York at that time, will meet jointly with the rubber group on this occasion. Several technologists are members of both organizations.

Future Meetings

THE American Chemical Society has scheduled the following meetings: August 19 to 23, 1935, San Francisco, Calif.; April 13 to 17, 1936, Kansas City, Mo.; Fall of 1936, Pittsburgh, Pa.; and Spring of 1937, Chapel Hill, N. C.

The executive committee of the Rubber Division, however, has decided that the fall meeting will not be held in San Francisco the week of August 19, in conjunction with the American Chemical Society. Instead the Rubber Division will convene in Akron, O., September 30 and October 1. The Hotel Mayflower will serve as headquarters.

Crude Rubber Committee

A CRUDE rubber committee, consisting of Harold Gray, B. F. Goodrich Co., chairman; W. A. Gibbons, United States Rubber Products, Inc.; George A. Sackett, Goodyear Tire & Rubber Co.; C. W. Walton, Boston Woven Hose & Rubber Co.; and E. B. Babcock, Firestone Tire & Rubber Co., was appointed by S. M. Cadwell, chairman of

the Rubber Division of the American Chemical Society, at the meeting in New York, N. Y., April 23. The formation of this committee resulted from an invitation by Edgar Rhodes, chief chemist of the Rubber Research Institute of Malaya, for American rubber consumers to organize for closer cooperation with those engaged in crude rubber production.

The function of this committee is to promote a better understanding between producers and consumers of crude rubber and to act as a clearing house between the two groups for information on the quality requirements for various crude rubbers, including latex; to exchange opinions on the value of new types of crude rubber, etc. It proposes to establish contacts with the various technical agencies allied with the producers on the matter of quality requirements, methods of testing, and evaluation of new types of rubber and latex, and will concern itself only with technical aspects of the problem, dealing only with those items the information on which can be made public.

Communications should be addressed to Mr. Gray, The B. F. Goodrich Co., Akron, O.

Surface Chemistry of Carbon Black [1]

Frank K. Schoenfeld[2]

CHANNEL carbon blacks retard the rate of cure of rubber compounds. Because the magnitude of this effect varies over wide limits, an elaborate and expensive routine of direct testing of blacks in rubber compounds is necessary to determine their curing behavior. With the hope of eliminating, standardizing, or predetermining the amount of this retardation of cure, numerous technologists, in both the rubber and gas black industries, have investigated the phenomenon. In general their conclusions are that carbon black retards cure through adsorption. However interpretations as to what is adsorbed and the mechanism of that adsorption so nearly equal the commentators in number that a critical review of the problem is needed.

Summary

The adsorption explanation for the fact that carbon black retards the rate of cure of rubber stocks is reviewed. Evidence is presented showing that if adsorption is a factor, it is probably of the activated type. It is shown that oxygen forms an acidic complex with carbon which retards the rate of cure of rubber stocks in the same manner as do organic acid retarders of cure. Nonacidic and acidic organic impurities have been isolated from commercial carbon blacks. The nonacidic impurities have no effect on the rate of cure of rubber. The acidic impurities appear to be the determining factor governing the retardation effect evidenced by gas black.

[1] *Ind. Eng. Chem.*, May, 1935, pp. 571-77.
[2] B. F. Goodrich Co., Akron, O.

Hydrogenation-Cracking of Rubber [1]

C. M. Cawley and J. G. King [2]

THE manufacture of motor spirit from surplus rubber is a possibility, and attempts have been made to produce a satisfactory spirit by the destructive distillation of rubber. The results obtained by this process, however, have not been promising in that the spirit produced is very unstable and may contain as much as 80% of unsaturated hydrocarbons. It is therefore extremely difficult, if not impossible, to refine by the usual methods. Hydrogenation in the presence of catalysts offers a means of refining such a crude spirit, but it would seem a more satisfactory procedure to subject the rubber itself to hydrogenation-cracking.

The authors recount in detail experiments with the method in a continuous plant and also give descriptive data of the products obtained: namely, motor spirit lubricating oil and viscous residue.

Conclusions

Rubber is amenable to treatment by the process of hydrogenation-cracking at a pressure of 200 atmospheres of hydrogen and at temperatures above 360°. The rubber is suitably treated in a continuous plant in the form of a solution containing 50% of rubber and 50% of an oil boiling above 200° obtained by the hydrogenation of rubber.

At a reaction temperature of 450 to 480°, and in the presence of a molybdenum catalyst, a high yield of spirit (boiling up to 200°) is obtained. In one passage of the raw material over the catalyst the yield is from 40 to 60% by weight of the rubber solution, the remainder being oil (53 to 18%) and gaseous hydrocarbons. The crude product is a pale yellow mobile oil, and the fraction boiling below 200° a water-clear spirit. The latter contains aromatic 15, unsaturated 1.5, and saturated hydrocarbons 83.5%. It therefore requires only very little refining to make it stable on storage.

As the reaction temperature is lowered, the yield of spirit decreases while that of high-boiling oil increases. The high-boiling oil also becomes more viscous. Thus at 370° the yields, as percentages by weight of the rubber solution, are: spirit boiling up to 200° 10.6%, and oil boiling above 200° 87.6%. The latter is distilled to produce 46.7% of Diesel oil, 21.5% of lubricating oil, and 19.4% of residue. The greater part of the Diesel oil and the high-boiling residue is required to prepare rubber solution for use as the raw material.

Rubber can therefore be treated by a hydrogenation-cracking process to yield either motor spirit alone or motor spirit, fuel oil, and lubricating oil, depending on the temperature of treatment. As a commercial project, the rubber treated would require to be surplus production available to the process at a much lower cost than that of rubber which is purchased in the normal market.

[1] *J. Soc. Chem. Ind.*, Apr. 26, 1935, 118-22T.
[2] Fuel Research Station, Dept. of Scientific and Industrial Research.

Anti-Flexing Antioxidants

THERMOFLEX, (di-para-methoxy-diphenylamine) an antioxidant, is a brown powder suitable for use in dark stocks only because it discolors on exposure to sunlight. It fluxes readily in rubber, is exceptionally effective for preventing cracking of vulcanized rubber due to flexing. The normal requirement is 1% on the rubber, but it does not bloom when used in amounts up to 1.5% on the rubber content. Thermoflex is recommended for maximum protection against cracking of rubber in tire treads and all services where severe flexing occurs.

Thermoflex A is a mixture of secondary aromatic amines. It is a dark gray powder fluxing readily in rubber. Because of discoloration on exposure to sunlight, it is suitable for use only in dark stocks. The normal requirement is 1% on the rubber, but it does not bloom when used in amounts of 1.5% on the rubber content. It is recommended for the protection of dark rubber stocks to be used in severe flexing service.

Latex Accelerators

ACCELERATOR 85 is a 50% water solution of the potassium salt of mercaptobenzothiazole. This relatively high-temperature latex accelerator has flat curing range and gives excellent aging. It does not discolor rubber, is odorless, and activated by basic accelerators and aldehyde amines. It is recommended chiefly for latex compounds to be cured at relatively high temperatures.

Accelerator 87 is a 50% water solution of potassium pentamethylene dithiocarbamate. This very fast ultra-accelerator is active from room temperature up. It does not discolor or impart any pronounced odor to the cured rubber.

It gives excellent aging properties and is activated by thiuram, thiazole, and aldehyde-amine type of accelerators. It is recommended chiefly for vulcanizing latex compounds at low temperatures.

Accelerator 122 is a 50% water solution of potassium salt of mercaptobenzothiazole and potassium pentamethylene dithiocarbamate. This ultra-accelerator is very fast and active from room temperatures up. It does not discolor or impart any pronounced odor to cured rubber. It gives excellent aging properties and is activated by thiuram and aldehyde-amine type of accelerators. It is recommended chiefly for vulcanizing latex compositions at low temperatures.

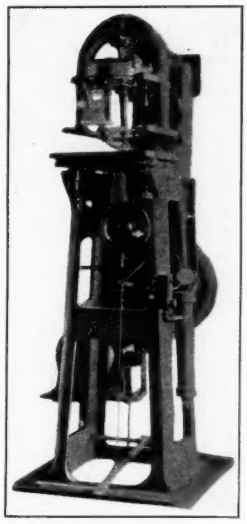
Each of these accelerators is stable, but should be stored in glass or iron.

New Machines and Appliances

Mechanical Goods Rubber Cutter

CUTTING raw or cured strips or rods of rubber up to 3½ inches in cross-section, for mechanical goods preparation or finishing, can be accomplished with the newly developed Black Rock automatic guillotine cutter with great speed and absolute accuracy. A 13-inch wide by 12-foot long motor driven variable speed conveyer communicates with the wide cutting table of the sturdy, vertically imposed cutting machine. Three heavy steel uprights form the side members of the upper framework of the machine and serve the dual purpose of supporting the top casting and acting as rigid guides for the heavy guillotine knife holder. Between the stationary top casting and the movable knife holder, and connecting the two, is a toggle mechanism activated laterally by a powerful fast-acting air piston. The toggle principle of raising and lowering the knife assures a quick, powerful cutting force, yet definitely limits the downward stroke, thus prolonging the life of the knife edge and preserving the surface of the cutting table. Fine feed adjustments can be made as the machine operates. An electrically operated brake permits stopping the machine instantaneously in any position.

The machine will cut, at one time, as many strips as the width of the conveyer will accommodate, producing pieces of any desired length up to 14 inches at a knife stroke speed varying from 15 to 50 per minute. The Black Rock Mfg. Co., 175 Osborne St., Bridgeport, Conn.



Patten Sole Cutting Machine

Bevel-Edge Sole Cutter

IN THE manufacture of rubber shoes it is necessary that the soles be cut with edges beveled in order that the thin edge thus produced may be easily and perfectly attached to the upper in making the shoe. Successful machine cut bevel-edge soles became a possibility with the introduction of the Wellman machine in 1891. It has since been displaced by the Patten machine, which in turn has been improved by changes providing for its operation by compressed air and an individual motor.

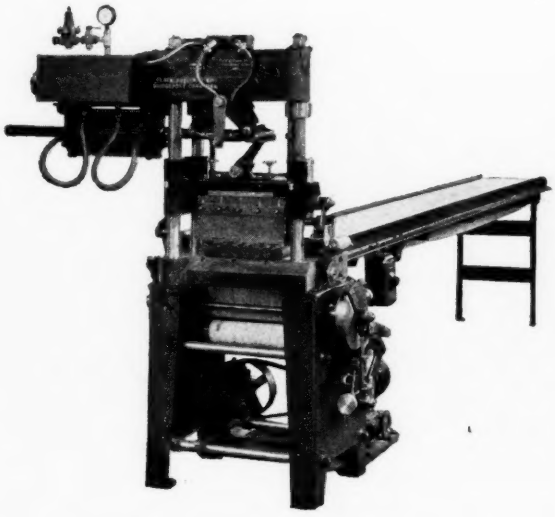
The machine is operated by a man assisted by three boys who handle the stock and scrap. Its output is 6,400 pairs of soles in 8 hours as compared with a maximum of 1,000 pairs in 10 hours by the old hand method. The machine is 6 feet in height, 32 by 38 inches base, weighs 700 pounds, and is operated by a single horsepower motor.

Bevels varying from 27 to 90 degrees can be cut by using appropriate patterns which are easily and quickly interchanged as required.

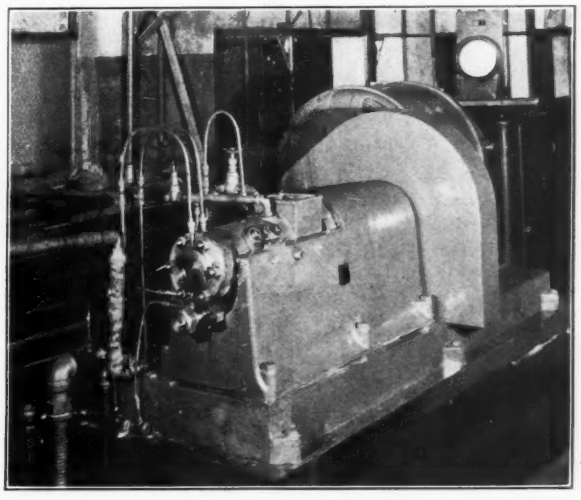
In operation the steel pattern is held rigidly, and the soling stock to be cut rests on an iron table beneath the pattern. By means of compressed air the cutting table is raised until the stock is in contact with the pattern, at which time the motor comes into action, and the knife circles the pattern, cutting the sole with a bevel. Wellman Co., Medford, Mass.

Plasticator and Tuber

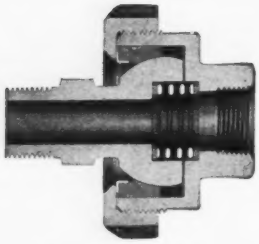
A COMBINATION plasticator and tubing machine designed for laboratory use has a 3-inch rotor and all the features in miniature of the large machine. Built for experimental purposes, it has proved very successful as a plasticator for crude rubber, also in some preliminary work fine grinding reclaim crumb and even in such a foreign field as masticating certain basic lacquer materials. An hour of work suffices to convert the machine from a plasticator to a tubing machine. Any form of screw or head can be used either for purposes of experiment or for regular laboratory or small scale commercial production. As shown in the illustration, the machine is mounted on a heavy cast-iron base plate which also holds the motor. The drive pinion, of one of the noise



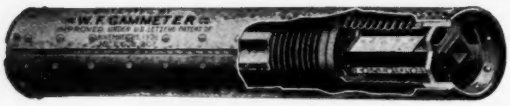
Black Rock Automatic Guillotine Cutter



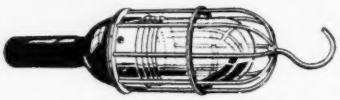
Farrel-Birmingham Laboratory Plasticator and Tubing Machine



Barco Swivel Joint



Gammeter Heavy Duty Shell



McGill Portable Guard

Paasche Airbrush

reducing materials, is cut with the Sykes continuous herringbone tooth and is free from annoying noise or vibration. A 20 h.p. variable speed motor drives the machine, but most of the operations require considerably less power. Two hundred and forty pounds of smoked sheet can be broken down in an hour. The amount of breakdown obtained in one pass is about equal to fifteen minutes' working of twenty-five pounds on a sixty-inch mill. Successive passes through the machine give increasing hourly production and better plasticity. Farrel-Birmingham Co., Inc., Ansonia, Conn.

Flexible Coupling

AN IMPROVED swivel joint for use on platen presses, tire and tube molds, and similar machinery, to connect piping between moving parts is herewith illustrated. The new joint now incorporates a metal washer or bearing at each end of the spring, thus eliminating the spring wear on the two major parts, viz.: the ball and casing. This improvement not only prolongs the life of the major portions of the joint, but greatly reduces possibility of spring breakage. Barco Mfg. Co., Chicago, Ill.

Chromium Plated Molds

RUBBER molds with curing surfaces properly plated with chromium will produce articles of glass-like smoothness and of excellent appearance. The life of costly molds for producing articles of exacting dimensions is said to be materially prolonged because of the very hard non-reactive cavity surface, which eliminates the necessarily injurious abrasive methods of cleaning.

The successful application of chromium plating to rubber curing equipment is the result of developing methods for closing the pores of the metal surface to be covered and of designing poles suitably conforming to the cavity shape so as to produce a heavy deposit of uniform thickness. The National Sherardizing & Machine Co., 868 Windsor St., Hartford, Conn.

Improved Calender Shell

THE internal construction of large-diameter calender shells has been modified to withstand the service required by modern usage. As shown in the illustration, the body of the shell is reenforced with corrugated steel members to overcome collapse and denting. Flexing of the mandrel within the central tube of the shell is compensated by malleable hubs which not only greatly stiffen the web of the spider, but also provide liberal bearing surface for support of the central tube. The W. F. Gammeter Co., Cadiz, O.

Vaporproof Portable Guard

THIS Underwriter approved safety vaporproof guard for portable electric lights is an essential fitting for use in rubber cement making rooms and dipped goods departments and wherever flammable vapors may accumulate. This guard is designed to meet the requirements of safety against gas explosions. It has a heavy steel frame, strong handle, and vaporproof lamp receptacle. McGill Mfg. Co., Valparaiso, Ind.

Boschert Hydraulic Press Valve

Mold Lubricating Airbrush

RECENT developments in the design of airbrushes have culminated in a device especially designed to lubricate rubber molds evenly and perfectly with either powder or solution. A single central pressure tank can be fitted with as many as eighteen airbrushes, any or all of which can be used at one time with positive assurance against clogging or sputtering. This airbrush is said to deliver the lubricant to the desired surface without piling in mold corners and without throwing a fog of excess material which settles as dust and contamination on other work and equipment in the vicinity of operation.

Steel Rule Dies

WITH the improved Multiform Rule Bender and accessories dies of all sizes and designs, regardless of intricate shapes, can be made quickly and economically. Application of this die making principle finds advantageous use in all types of rubber manufacturing, but is of indispensable importance to the preparatory and finishing operations of all rubber lines involving molded and hand-made specialties, shoes, wearing apparel, druggists' sundries, and sheet stocks. A die-making service is also maintained for small operators who have infrequent need of die-cutters. J. A. Richards Co., Kalamazoo, Mich.

Hydraulic Press Valve

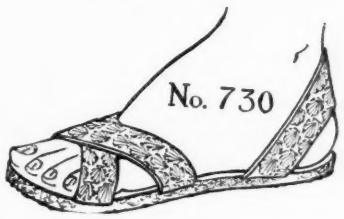
THE illustration shows an operating valve for presses having large rams which may or may not have retracting cylinders connected direct to the accumulator line. A large relief check is provided for rapid opening of the press. In a valve of this type the accumulator line pressure enters on the top of the checks, and when the handle is in central or neutral position, there is no flow of water to the press. A movement of the handle to the first notch position admits water from the low-pressure line. A further movement of handle in the same direction to the second notch admits water from the high-pressure line, and a check valve between the high pressure and the low pressure prevents the high pressure backing up on the low-pressure line. A movement of handle in the reverse direction opens the press relief and closes both high and low pressure inlets. The checks and seats, of Monel metal, are renewable when worn. The body of the valve is of manganese bronze. The Dunning & Boschert Press Co., Inc., Syracuse, N. Y.

New Goods and Specialties

Sponge Rubber Sandals

THE comfortable sponge rubber sandal, illustrated herewith, is recommended for use at beach, pool, and home. It consists of a molded sole with toe and heel straps bearing an attractive shell design. Two styles are available for women. One features a heel and a triple-toe strap; while the other, heelless, has a cross-strap in front. A similar model is made for children. All these sandals come in white, green, blue, yellow, and red.

For men appears a white or black sandal with soft sponge sole, and a plain sponge strap that slips over the heel and another across the toe. Like the sandals for the women and children, these also are made in three sizes, small, medium, and large. Davidson Rubber Co., Charlestown, Boston, Mass.



Women's Beach Footwear

Tire for Wagon Wheels

THE B. F. Goodrich Co., Akron, O., is marketing a new product, Goodrich Silvertown Wagon Wheel, which is a pneumatic tire specially designed for retail delivery wagons. A complete assembly of these tires, wheels, axles, and brakes facilitates changing over from present equipment to this new type.

Tread and sidewall of the new tire are designed to give maximum resistance to wear for a long time and to resist deterioration caused by long exposure under all kinds of weather conditions. Sidewalls are extremely tough to resist curb chafing. The tread design is shallow because on gravel roads at slow speeds a deep tread design tends to pick up and hold small stones much more than does this new tire. Tires are of nominal cross-section with adequate capacity rating for retail delivery service.

Several standard wheel assemblies are available, each a complete unit, which make this type of changeover very easy. Three kinds of wheels, steel disk, wire, or malleable iron modified disk, may be selected. Many assemblies are complete with tires, wheels, hubs with bearings, hub caps and necessary studs and bolts for applying and mounting wheels, two-shoe brakes, complete with cables, and square steel alloy axles machined for bearings.

Advantages of pneumatic tired wagons as compared to the ordinary wheels are:

Lower draw-bar pull to start and move wagon. Tests show rubber tired equipment starts and rolls much easier than steel tires, and with the addition of anti-friction bearings the rubber tired equipment moves as much as 50% easier than the steel tired wagon.

Operators have found that with rubber tired equipment they could get along with fewer horses.

Lower maintenance costs. Operators estimate an average yearly cost of replacing and resetting steel tires to be about $25.00 per wagon. Other wagon maintenance costs also are reduced.

Reduced weight. On the average, pneumatic tired equipment reduces the weight of the empty wagon 200 to 350 pounds, an important factor in reducing starting effort required to move the wagon.

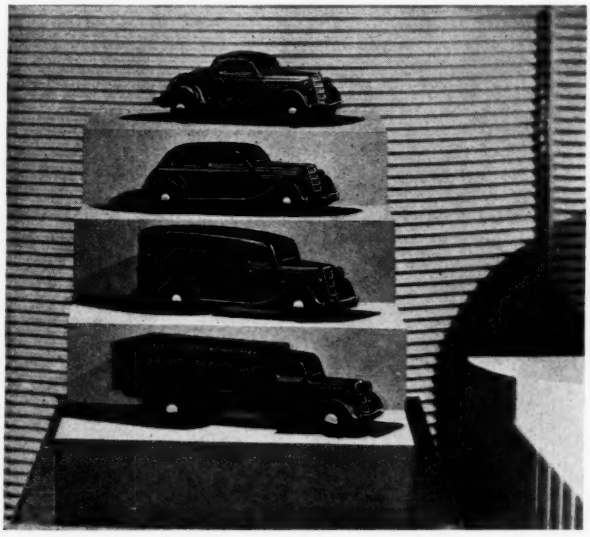
Pneumatic tires are safer. Pneumatic tired equipment does not slide on wet or icy streets. Where automotive type brakes are used, vehicles are safe from runaways.

Goodrich Silvertown Wagon Wheel

New Glove

Electrician's Glove

A NEW exceptionally high dielectric resistant electrician's glove assures greater economy and a decided increase in its factor of safety because of the unique construction that prevents tears, scratches, and abrasions on the gauntlet which results in the elimination from service of a high percentage of ordinary gloves. The glove-experienced inventor has devised a cuff reenforcement that doubles its thickness as compared with that of the hand and fingers, thus gaining the above mentioned advantages without impairing the operator's freedom of action. Frank E. Barns Co., 130 N. Wells St., Chicago, Ill.



All-Rubber Automobiles by Barr

Toy Rubber Cars

THE Barr Rubber Products Co., Sandusky, O., is manufacturing an unusual type of rubber toy merchandise consisting of a complete line of a popular American automobile in miniature. The faithfulness of reproduction and degree of detail incorporated is surprising. Radiator grills, body moldings, windshield wipers, door handles, etc., are all shown in tiny detail. The cars are molded, all-rubber, even to the sparkling finishes which are dipped and cured directly to the cars. Plated metal hubs used to fasten the wheels to the cars are the one exception to the all-rubber material schedule.

Editor's Book Table

RUBBER BIBLIOGRAPHY

RESEARCH ON MODIFIED RUBBERS. Part VI. The Oxidation of Rubber Solutions with Gaseous Oxygen in Presence of Catalysts. G. F. Bloomfield and E. H. Farmer, *J. Soc. Chem. Ind.*, May 10, 1935, pp. 125-33T.

INFLUENCE OF CATALYSTS IN THE REACTION OF SULPHUR ON UNSATURATED ORGANIC SUBSTANCES. I. A Study of Vulcanization at Elevated Temperature. O. Schwarzkopf, *Rubber Chem. Tech.*, Apr., 1935, pp. 225-29.

VISCOMETRIC STUDIES OF RUBBER SOLUTIONS. M. Reiner, *Rubber Chem. Tech.*, Apr., 1935, pp. 259-65.

WATER BATH HAVING SUBMERGED INDIVIDUAL SAMPLE-CONTAINERS FOR THE ACCELERATED AGING OF RUBBER IN AIR. W. L. Holt and A. T. McPherson, *Rubber Chem. Tech.*, Apr., 1935, pp. 302-304.

CABLE DISCHARGES IN UNDERGROUND DUCTS. E. A. Smith and M. E. Steinbach, *J. Franklin Inst.*, May, 1935, pp. 597-602.

HYDROGENATION CRACKING OF RUBBER. C. M. Cawley and J. G. King, *J. Soc. Chem. Ind.*, Apr. 26, 1935, pp. 117-23T.

SURFACE CHEMISTRY OF CARBON BLACK. F. K. Schoenfeld, *Ind. Eng. Chem.*, May, 1935, pp. 571-77.

DISPERSION OF CARBON BLACK IN RUBBER. C. R. Park and V. N. Morris, *Ind. Eng. Chem.*, May, 1935, pp. 582-86.

HEATS OF REACTION OF THE SYSTEM RUBBER-SULPHUR. A. T. McPherson and N. Bekkedahl, *Ind. Eng. Chem.*, May, 1935, pp. 597-602.

STABILITY OF CHLORINATED RUBBER. J. Rinse, *Verfkronick*, 8, 47 (1935).

SOME ASPECTS OF MODERN RUBBER PLANTING. A. G. Barron-Toop, *India Rubber J.*, April 20, 1935, pp. 450-54.

CORROSIVE ACTION OF BRINES ON METALS AND RUBBER. W. Mohr and R. Kramer, *Food*, 4, 8 (1934).

CHEMICAL NATURE OF U.S.S.R. NATURAL CAOUTCHOUCS AND GUTTA PERCHAS. S. Reformatski and A. Schulpekova, *J. Appl. Chem. Russ.*, 4, 950-59 (1934).

VISCO-ELASTIC PROPERTIES OF RUBBER. J. C. Eccles and J. H. C. Thompson, *Proc. Roy. Soc., London*, A, 148, 171-85 (1935).

SUPPLIES OF LATEX. F. D. Ascoli, *Trans. Inst. Rubber Ind.*, Feb., 1935, pp. 352-64.

RUBBER IN RELATION TO FOODS AND BEVERAGES. T. H. Messenger, *Trans. Inst. Rubber Ind.*, Feb., 1935, pp. 365-92.

PHYSICO-CHEMICAL PROPERTIES OF LATEX AND THEIR SIGNIFICANCE IN MANUFACTURE. E. W. Madge, *Trans. Inst. Rubber Ind.*, Feb., 1935, pp. 393-415.

RUBBER INDUSTRY AT THE CROSSROADS. W. C. Geer, *Ind. Eng. Chem.*, Apr., 1935, pp. 362-67.

BOOK REVIEW

"Annual Survey of American Chemistry." Vol. IX. 1934. Edited by Clarence J. West. Published for The National Research Council by Reinhold Publishing Corp., 330 W. 42nd St., New York, N. Y. 1935. Cloth, 396 pages, 5½ by 8½ inches. Indexed. Price $4.50.

This survey of chemical progress for 1934 follows the same general principles as preceding volumes except that the chapter on "Biochemistry" is omitted. Many of the topics which would normally appear in such a chapter are included in the chapters on "Food" and "Fermentation." Of the twenty-five chapters this year twelve are devoted to industrial topics. An important feature of these chapters is that they suggest trends in the industry as well as present the accomplishments of the period covered.

In the chapter on rubber H. L. Trumbull, research chemist of The B. F. Goodrich Co., Akron, O., reviews chemical progress in that industry by topics in the following order: crude rubber, rubber hydrocarbon, vulcanization and the structure of rubber, accelerators of vulcanization, age resisters, control and testing, pigments, compounding ingredients, cements and adhesives, rubber technology, latex and rubber dispersions, synthetic rubber and rubber-like products, derivatives of rubber.

In the chapter on "Textile Chemistry" references are made to the industrial uses of rubber latex, lactron and Lastex, and DuPrene as applied to textiles.

DETERMINATION OF FREE SULPHUR IN RUBBER. A. F. Hardman and H. E. Barbehenn, *Ind. Eng. Chem.*, Anal. Ed., Mar. 15, 1935, pp. 103-104.

MANUFACTURE OF RUBBER IMITATION-LEATHER SOLES. *Caoutchouc & guttapercha*, Apr. 15, 1935, pp. 17114-16.

FROM THE ANCIENT HISTORY OF THE MANUFACTURE OF SPONGE RUBBER. P. Kohler, *Kautschuk*, Apr., 1935, pp. 69-71. (Conclusion.)

SURVEY FROM THE HAMBURG RUBBER WATCH-TOWER. About the Discussion Evening of the Hamburg Section of the German Rubber Society. W. Esch, *Kautschuk*, Apr., 1935, pp. 73-74.

TALCUM AND TALCUM SUBSTITUTE IN THE RUBBER INDUSTRY. R. Ditmar, *Kautschuk*, Apr., 1935, pp. 75-77.

POSITION OF FACTICE IN MODERN COMPOUNDING TECHNIQUE. E. Wurm, *Gummi-Ztg.*, Apr. 12, 1935, pp. 364-65; Apr. 19, pp. 392-93.

NEW MACHINES AND APPARATUS FOR THE RUBBER INDUSTRY. *Gummi-Ztg.*, Mar. 29, 1935, pp. 311-12; Apr. 12, pp. 366-67.

NEW PUBLICATIONS

"Camachines." Cameron Machine Co., 61 Poplar St., Brooklyn, N. Y. The extensive line of highly perfected Cameron slitting and roll-winding machines illustrated and described in this catalog relates primarily to paper slitting equipment. Many of these machines, however, are also used for slitting fabrics, rubber, artificial leather, etc. Thus this catalog will be of particular interest to many manufacturers of rubber goods.

"Three-Lead, Null-Type Electrical-Resistance Thermometers." Bulletin 4001. Leeds & Northrup Co., 4900 Stenton Ave., Philadelphia, Pa. This treatise illustrates and describes equipment that has been highly standardized over a period of thirty years in applications where conditions are similar to those now presented by air conditioning. No other method for measuring temperatures meets so exactly the needs of air conditioning as the electrical-resistance thermometer method using null-type (Wheatstone bridge) instruments and three-wire leads. In this bulletin this correct thermometer principle correctly applied is adequately presented.

"1935 Yearbook of the Tire and Rim Association, Inc." The Tire & Rim Association, Inc., 1401 Guarantee Title Bldg., Cleveland, O. This authoritative collection of data includes engineering and miscellaneous facts on tires, rims, and valves. The book is thumb indexed for reference to passenger car, truck and bus, motorcycle, airplane, slow speed tractor and trailer, solid, and cushion tires, also miscellaneous tabulations. Copies are obtainable at $2 each.

"The Fallacy of Wage and Hour Controls." No. 12 in a Series of Booklet-Editorials. Allen W. Rucker in collaboration with N. W. Pickering, president, Farrel-Birmingham Co., Inc. Copyright, 1935. Farrel-Birmingham Co., Inc., Ansonia, Conn. The experience of the past two years, analyzed and charted in this booklet, confirms the view that artificial increases in wage rates and restriction of working hours imposed by NRA increase manufacturing costs and result directly in diminishing employment and reducing the annual income of workers. Sooner or later it must be recognized that economic law foredooms to failure every effort made to benefit workers by artificial control of wage rates and working hours. It is to be hoped that that recognition may come without much more delay so that the nation may the sooner get down to a true basis for recovery.

(*Continued on page* 80)

Rubber Industry in America

OHIO

THE most important development in the Cleveland district was the settlement of the strike in the automobile industry, which permitted resumption of operations at many local plants employing hundreds of workers. One unfavorable condition in connection with labor difficulties is that the worker, not knowing when he may be called out on strike, is saving his wages, which non-spending is affecting adversely many businesses.

Activity in the rubber manufacturing industry declined in March. Daily average crude rubber consumption was less than in February and about 7% lower than a year ago.

Price movements of crude, influenced by international financial developments, have been erratic during the past month. After dropping to 10½¢ in March, the price has recovered to about 11¾¢. The retail tire price structure was also unsettled, with discount allowances prevalent. This movement is undoubtedly influenced by the high stocks of tires built up in anticipation of the recent rubberworkers' strike. The industry, as a result of price concessions, succeeded in disposing of a large number of tires in April, but because of the abnormal situation, sales so far this month are reported quite limited. The marked increase in new car sales tends to effect a lag in tire replacements. Manufacturers of machine tools were quite encouraged by the volume of orders received in April, compared with corresponding months of preceding years.

The average annual wages of Akronites employed in making tires and tubes either part or full time during 1933 was $1,076. Workers engaged in the manufacture of other rubber goods, either full or part time, earned an average of $808.

National Battery Manufacturers' Association, Inc., in view of the continued changes in legislation and NRA policies postponed its spring convention originally set for May 22 and 23 at Hollenden Hotel, Cleveland.

The Chardon Rubber Co., Chardon, manufacturer of molded mechanical rubber goods and tube machine products, at a recent annual meeting of the directorate elected Vice President V. M. Brediger, who also has been general manager of the company since its inception five years ago, to the presidency. Other members of the board of directors follow: R. H. Bostwick, chairman; C. L. Shreiner, vice president and sales manager; and W. W. Smith, treasurer.

Goodrich Activities

David M. Goodrich was again named chairman of the board, J. D. Tew reelected president, and other officers of The B. F. Goodrich Co., Akron, reelected at the annual meeting of the company's directors following the annual stockholders' meeting in May. Other officers reelected are: S. B. Robertson, vice president and general manager tire division; J. H. Connors, vice president and general manager mechanical division; C. B. Raymond, T. G. Graham, and J. J. Newman, vice presidents; S. M. Jett, secretary; V. I. Montenyohl, treasurer; T. B. Tomkinson, comptroller; A. D. Moss, director of purchases; J. L. McKnight, W. D. Eakin, and J. C. Herbert, assistant secretaries; L. L. Smith and G. W. Hubbell, assistant treasurers; W. M. Bechler and H. V. Gaertner, assistant comptrollers. Members of the executive committee were reelected: Messrs. Goodrich, Tew, A. H. Marks, Charles S. McCain, W. D. Ticknor, and Sidney J. Weinberg. At the annual stockholders' meeting all directors whose terms expired were reelected, as follows: Messrs. Goodrich, Marks, Weinberg, Raymond, Tomkinson, and Jett.

Goodrich will close its factory the week of July 1, 1935, for mid-year inventory. Employes with five years of service entitling them to a week's vacation with pay will take it then; while ten-year employes, who get two weeks, will take part of their vacation at this time.

Last month seven graduates of the Goodrich apprentice school received their diplomas at exercises attended by former graduates, students, and company officials.

Ben T. Cowherd was named operating manager of the Pittsburgh district. He joined Goodrich in Detroit in 1919 as a clerk and has since held many responsible posts. He comes to his new post after serving as operating manager of the north-central district of the company.

Harry C. Spring was appointed division operating manager for the Cleveland division, comprising the Cleveland and the Buffalo districts, with headquarters in Cleveland. Mr. Spring joined Goodrich in 1916 as a bookkeeper. He had been a branch manager for the company and more lately operating manager of the north-central district.

Paul Montgomery, of the Goodrich tire division, succeeded Robert Hart as chairman of the appellate council of the factory employes' cooperative plan. He will serve during the coming year.

The Ohio Pail Co., Middlefield, parent company of the Johnson Rubber Co., for years has been manufacturing light gage steel pails and drums. The firm recently sold the pail division of this business and plans in the future to confine its efforts to the manufacture of a new type of knock-down steel reels and metal stampings of the type used in combination with rubber in the automotive industry. The sale of the pail business of this company makes it possible for it to devote all of its efforts to its new lines and to the further expansion of its mechanical rubber business, which has shown a remarkable growth. The personnel of this company consists of Smith M. Johnson, president; Lugh M. Johnson, vice president and general manager; Hugh G. Johnson, secretary and treasurer; and Pierce Sperry, sales manager.

F. A. Seiberling, president of the Seiberling Rubber Co., Akron, with Mrs. Seiberling recently returned from a Mediterranean cruise, where he combined business with pleasure by visiting also foreign offices of the company.

The Bearfoot Sole Co., Inc., manufacturer of sport rubber soles, heels, bases, quarter linings, cements, etc., with main office and warehouse at 116 Lincoln St., Boston, Mass., and factory in Akron, O., through Treasurer I. B. Calvin has announced that Herman Westling, formerly with Cambridge Rubber Co., Cambridge, Mass., and Lambertville Rubber Co., Lambertville, N. J., has joined the Bearfoot firm to engage in development work. Frank E. Alston was recently appointed representative in the St. Louis, Mo., district; while The Wm. B. Heald Co., Chicago, Ill., has joined the sales organization and is in charge of the Northwest territory. The footwear concern, which was incorporated in Massachusetts in 1924, rents manufacturing space at the Seiberling Rubber Co. factory in Barberton, O., where equipment is installed and production is in full swing. On April 13, 1934, Bearfoot purchased the entire equipment of The Fairfield Rubber Co., Lancaster, O., which plant was completely dismantled and part of the equipment sold. Some of the remainder was brought to the Barberton factory, and the rest was shipped to the Kemitex Products Co., Wadsworth, O., where Bearfoot contemplates manufacturing a new and different line of footwear at some future date. Edwin Calvin, president of the company since it was founded, has his headquarters at the Boston office, where J. M. Calvin, export sales manager, also is stationed.

The Magnetic Gauge Co., 60 E. Bartges St., Akron, has perfected certain refinements in its continuous autographic thickness gaging device that, according to A. G. Ladrach, secretary-treasurer, add to the accuracy and material economizing possibilities which are obtainable with its use.

The Universal Engineering Corp., 109 N. Union St., Akron, maintain staff and equipment facilities for designing and manufacturing machinery for the special as well as the standard requirements of rubber, plastic, and other industries.

Worthington Ball Co., Elyria, has signed to its advisory staff Lloyd Gullickson, well known golf teacher and tournament player, who will also act as Ohio sales representative.

Burke Golf Co., Newark, through Vice President F. H. Thorp has announced that following the downtown trend of golf ball manufacturers' office locations in New York, N. Y., the company moved from 19 W. 45th St. to 11 Park Place. V. E. Sandeen has taken over the southeastern territory of the company, including North and South Carolina, Florida, Georgia, Alabama, and parts of Tennessee. C. E. Sedgwick, of Denver, was appointed representative in the Rockies district.

Master Tire & Rubber Corp., Akron, has announced that its subsidiary, The Cooper Corp., Findlay, has named Lewis N. Einsel, for many years representing tire manufacturers, district sales manager for central and northern New York, with headquarters in Buffalo, N. Y.

The Goodyear Tire & Rubber Co., Inc., Akron, during the building of the New Haven Comet by Goodyear-Zeppelin covered the fabric seats of the train with Pliofilm so that they would not become soiled during construction work. The Pliofilm was removed when the train was delivered. This new material is similar to Cellophane except that it is derived not from cellulose, but synthetically from rubber and has certain distinctive characteristics of its own including moisture proofness after being wrinkled or creased, some increased elasticity, greater tear resistance, and lightness in weight. Goodyear has also applied for a patent on a light raincoat made of Pliofilm, this colorless, flexible, waterproof sheeting derived from rubber.

NEW JERSEY

THE majority of rubber manufacturers report business holding up very well, but others announce a drop in production. The general increase in some lines is attributed to the busy season of the automotive industry. Little change has occurred in the hard rubber situation. Plants manufacturing heavy footwear are working on goods for next fall and winter.

Jos. Stokes Rubber Co., Trenton, reports that business continues fairly good both at the Trenton and Canadian plants.

Thermoid Co., Trenton, is still operating to capacity in all departments. The Woven Steel Hose & Rubber Co., owned by Thermoid, is also busy. Sales of Thermoid Co. and wholly-owned subsidiaries for the first quarter of 1935 increased more than 32% over the same period of 1934, according to Fred E. Schluter, chairman. In March, Thermoid and subsidiaries shipped more tonnage than in any month in the company's fifty-year history, except March, 1929, which exceeded March, 1935, by only 1½%. The gain in March this year over March last year was 28%.

Pierce-Roberts Rubber Co., Trenton, using two shifts, finds business slowing up.

Essex Rubber Co., Trenton, reports a general increase in all lines of rubber products. Prospects for early summer are good.

Murray Rubber Co., Trenton, announces good business at this time, with new customers for its tires and tubes.

Thiokol Corp., Yardville, is operating to capacity and manufacturing a new product, Thiokol B. Salesmen have already been supplied with samples. Company officials say summer prospects are good.

Lambertville Rubber Co., Lambertville, having resumed operations after a six-week shutdown, now employs 200 of its 400 workers. The calender room is running three days a week; while other employes work five days. Production is confined principally to heavy footwear, with little on tennis shoes. The salesmen were kept on the road during the shutdown.

Nearpara Rubber Co., Trenton, which recently suffered a severe loss by fire, is making repairs and improvements. The company has been going twenty hours a day reclaiming rubber.

The Pocono Co., Trenton, reports business good. Demand has increased for goods for the automotive industry.

Puritan Rubber Co., Trenton, operating to capacity, reports a general increase in business.

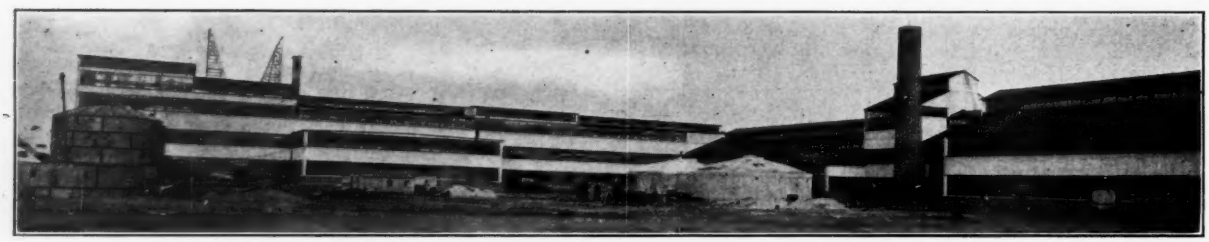
Frederick B. Sayen, of the Mercer Rubber Co., Hamilton Square, was appointed foreman of the Mercer County Grand Jury at Trenton.

Acme Rubber Mfg. Co., Trenton, is experiencing continued good business. President Horace T. Cook, also head of the Hamilton Rubber Mfg. Co., and Mrs. Cook recently returned from a stay of several weeks at Lake Wales, Fla. J. Edward Myers, Acme superintendent, was elected a member of Trenton Common Council, which takes the place of the city commission.

Charles E. Stokes, president of the Home Rubber Co., Trenton, and Mrs. Stokes spent some time in the Pocono Mountains.

John Waldron Corp., New Brunswick, has announced that as of July 15 its sales staff will handle the sale of its products directly in place of through Smith & Serrell, Newark, who heretofore functioned as general sales agents. F. W. Thomas, for the last ten years New York district manager of the coupling division of The Bartlett Hayward Co., has joined John Waldron as general manager of sales of the Francke coupling and silent gear departments.

The Hohwieler Rubber Co., engineer and manufacturer of molded rubber products, of which William Hohwieler is owner, W. Bridge St., Morrisville, Pa., makes rubber goods for a wide variety of industries, including rubber cements and rubber compounds for printers' rubber plates. The firm, which also develops new processes for the trade, has a practical consulting service and complete facilities for all kinds of rubber experimental work. The New York, N. Y., office is at 302 Broadway, and the Los Angeles, Calif., branch at 108 W. Second St.



General View of the New Plant of Titanium Pigment Co., Inc., at Sayreville, N. J.

EASTERN AND SOUTHERN

LOCAL dealers in machine tools, declaring spring buying reached levels not equaled since the depression began, expect an increasingly active market the rest of the season. Buying, spurred by fears of early inflation, has spread to a variety of industries not in the market earlier in the year. Even cotton textile mills have displayed more interest in new equipment. Sales in April were the heaviest for any month since 1929, and the machine-tool makers and sellers expect even a higher figure for May.

A southern tire manufacturer reports low dealers' stocks are causing a large volume of orders. Indications are that a sharp expansion in consumer demand for tires soon will enter retail markets. Business seems continuing on the upgrade, and prospects for the balance of the year are encouraging.

United States Rubber Co., 1790 Broadway, New York, N. Y., in a recent survey estimated at least ten million old worn tires are still in service.

Imperial Color Works, Inc., pigment manufacturer, Glen Falls, N. Y., has engaged Albert T. Nanovic, formerly with the New Jersey Zinc Sales Co., 160 Front St., New York, N. Y. He will have headquarters in Cleveland and will cover territory in Ohio, Pennsylvania, and West Virginia. Imperial relieved Adolph Fuchs, for many years district manager at Chicago, Ill., of his responsibilities May 1, and he will call on the trade from time to time in the interests of the company. His ill health necessitated this change. His old activities will be assumed by E. H. Pennebaker, district manager of the Chicago, Ill., office. Mr. Pennebaker previous to joining Imperial had worked for The B. F. Goodrich Co., Akron, O., and the New Jersey Zinc Sales Co.

Walter H. Dickerson, well-known crude rubber man, has joined Munds, Winslow & Potter, 40 Wall St., New York, N. Y., as an aid in developing the rubber department.

Titanium Pigment Co., Inc., 111 Broadway, New York, N. Y., elected Ralph M. Roosevelt president and a director; while W. F. Meredith, former president, was named chairman of the board of directors. Mr. Roosevelt was formerly vice president of the Eagle-Picher Lead Co., Cincinnati, O., and recently retired as president of the American Zinc Institute. Titanium has moved its research laboratory, under the direction of J. L. Turner, from Brooklyn, N. Y., to the new plant recently opened in Sayreville, N. J. Leonard G. Reichard is plant manager of this new unit, which employs about 400 workers and includes besides the research and development laboratories, in the administration building, buildings for employe welfare, machine shops, a power plant, a sulphuric acid plant, and docking facilities for unloading ore from ocean-going vessels.

Rubber Code News

The National Industrial Recovery Board on May 18 terminated the stay of the customer classification, price filing, and uniform terms of sale provisions of the mechanical rubber goods divisional code. This termination does not affect the code provisions for a waiting period before filed price schedules may become effective or those giving the code authority power to reclassify customers; those provisions are still stayed and inoperative.

On May 2 the board stayed the provisions of Article III and IV and Section 1 of Article V of the mechanical rubber goods division of the rubber manufacturing industry code. The provisions affected by the later order were stayed pending definite clarifying action by the divisional code authority; the others were stayed until amended in accordance with NRA policy.

The divisional code authority has sent to all members of the industry a letter emphasizing that only those terms of sale which have received specific NRA approval must be observed. The letter was sent with a copy of the approved uniform sales terms.

Another code authority letter instructs members of the industry to omit mention, either directly or indirectly, of Executive Order No. 6767 in their filed price schedules. This order permits a 15% reduction from filed prices when bidding for Government business.

The order terminating the stay of the uniform sales terms provisions of the code also permits the schedule of terms previously approved, but which was also suspended May 2, to become operative again.

In transmitting the letters sent to all members of the industry the divisional code authority requested immediate termination of the stayed provisions in order to prevent complete breakdown of code observance.

Code Authority Members

Rubber Manufacturing Industry. Rainwear Divisional Code Authority, William H. Lichtenstein, chairman; Moe Sherman, vice chairman and alternate.

Automobile Fabrics, Proofing, and Backing Divisional Code Authority, A. A. Glidden, Watertown, Mass.; J. T. Callahan, Milford, Mass.; R. N. Freydberg, Brooklyn, N. Y.; J. D. Lippmann, Toledo, O.; N. Boynton, Jr., Boston, Mass. Alternates are A. K. Dannenbaum, Philadelphia, Pa.; C. Kenyon, Jr., Brooklyn; F. N. Kite, South Boston, Mass.; C. H. Davis, Detroit, Mich.; W. H. Jenks, New York.

Rubber Tire Manufacturing Industry. F. B. Davis, Jr., New York; J. W. Thomas, P. W. Litchfield, J. D. Tew, F. A. Seiberling, William O'Neil, C. Borland, all of Akron; I. Eisbrouch, Charlotte, N. C. Alternates are E. D. Levy, Chicopee Falls, Mass.; J. A. Walsh, West Haven, Conn.; G. W. Stephens, Mansfield, O.; C. C. Gates, Denver, Colo.; H. C. McCreary, Indiana, Pa.; A. A. Garthwaite, Conshohocken, Pa.; Carl Pharis, Newark, O.; J. A. MacMillan, Dayton.

Narrow Fabrics Industry. John R. Dennis, Providence, R. I.; H. W. Conant, East Hampton, Mass.; F. H. Frissell, Middletown, Conn.; C. B. Stretch, Brockton, Mass.; A. T. Terrell, Ansonia, Conn.; C. M. Aldrich, Providence; A. L. Kelley, Pawtucket, R. I.; S. R. Fry, Reading, Pa.; W. A. Lations, Worcester, Mass.; H. A. Smith, Needham Heights, Mass.

Sanitary and Waterproof Specialties Manufacturing Industry. R. K. Guinzburg, J. W. Goldsmith, and Sigmund Stein, all of New York; and Kurt Heitler and L. H. Rand, both of Brooklyn.

Scrap Rubber Trade. (Resignations and Terminations of Code Authority Members.) Elden R. Carl.

Official NRA Orders

Rubber Manufacturing Industry, Code No. 156: Order 74, granting to Jenkins Bros., Bridgeport, Conn., a stay of the provisions of Chapter VII, Article V-A, Section 3, of the Code.

Order 75, denying to Tyer Rubber Co., Andover, Mass., exemption from the provisions of Chapter I, Article V-A, Section 1, of the Code.

Order 75A, granting exemption from Section 1, Article V, to The B. F. Goodrich Co., Akron, O., to the extent that 25 employes may work Sunday, April 7, on production of rubber lined piping for du Pont provided all employes so working be paid time and one-third for all hours in excess of 40 per week.

Retail Rubber Tire and Battery Trade, Code No. 410: Order 22, approving budget and basis of contribution for the period of May 1, 1934, to June 16, 1935.

Following the unanimous decision, on May 27, by the Supreme Court on the unconstitutionality of the NIRA, all codes were immediately suspended.

R. & H. Chemical Division of E. I. du Pont de Nemours & Co., Inc., is expanding its space in the Empire State Building, 350 Fifth Ave., New York, N. Y.

Kenneth Burgess, of the Magnetic Pigment Co. and the Binney & Smith Co., both of 41 E. 42nd St., New York, N. Y., recently addressed the Louisville Paint & Varnish Production Club on "Precipitated Pure Iron Oxides and Their Application to Industrial Finishes." The properties, characteristics, and constants of the pigments were illustrated with lantern slides, and the scope of the research work described. A moving picture in color explained the manufacture and process control.

Whittaker, Clark & Daniels, Inc., manufacturer of and dealer in minerals, colors, and chemicals, on June 1 moved its general offices to 260 West Broadway, New York, N. Y. Telephone: Walker 5-3750-3753. The old quarters at 245 Front St. are being retained for laboratory purposes.

The McClaren Rubber Co., Charlotte, N. C., which for two months had been running on a 4½-day weekly schedule, is now running at capacity six full days a week, twenty-four hours daily. President I. Eisbrouch also announced this schedule will give the plant the greatest production in the company's history as additional machinery, all of the latest and most efficient design, has been installed. Dealers' present stocks of McClaren tires and tubes are low, and many new orders are coming in.

The American Zirconium Corp., St. Helena, Md., the fourth company in the United States to enter the titanium pigment field, has appointed as its new technical director L'Roche George Bousquet, formerly chemical engineer of the Titanium Pigment Co., Inc., branch in St. Louis, Mo.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., has transferred from its Gray's Ferry plant to its newly acquired factory at Toledo, O., Fin Dallas Sparre to act as supervisor of one of the production departments. Both plants are sections of the Fabrics and Finishes Division of the company.

Herbert J. Winn, president of Taylor Instrument Cos., Rochester, N. Y., sailed from New York, May 15, for London on a five-week business trip. A major part of his time there will be spent at the plant of Short & Mason, Ltd., manufacturing distributer of the Rochester firm in Great Britain.

The Brown Instrument Co., Philadelphia, Pa., manufacturer of instruments and controls, and the **Minneapolis-Honeywell Regulator Co.,** Minneapolis, Minn., have opened a joint office at 101 Marietta St. Bldg., Atlanta, Ga., to serve the Southeast. W. R. Moore, Brown district manager, has been appointed manager of this office, with Leon L. Kuempel, sales engineer; Charles A. Kitzeinger, service engineer; and J. A. Crawley, office manager.

The Fifteenth Exposition of Chemical Industries will be held at Grand Central Palace, New York, N. Y., December 2 to 7, 1935. According to advance indications this exposition will be one of the largest in recent years. Unique in the world, the Exposition of Chemical Industries reaches a world market. Admission is without charge and by registration or invitation only. No tickets are sold. This year's presentation will be directed by the International Exposition Co. with headquarters at Grand Central Palace. Charles F. Roth, who has managed the Exposition of Chemical Industries since its inception twenty years ago, will be personally in charge.

(Continued on page 73)

NEW ENGLAND

WITH the industry entering the period of seasonal dullness, manufacturers of rubber goods in Rhode Island report the general level of operations held practically unchanged during May. Both inventories and distribution are said to be above the figures for the corresponding period of 1934; while collections generally are improved. Continued uncertainty over pending federal legislation, however, is said to be a retarding factor in the industry. But the sentiment is that the future is more promising and encouraging than it has been for some time.

Plant heads still are worried over the imports of low-priced goods from Japan. They feel that eventually something must be done by Washington to restrict the steady and increasing inflow in view of the threat to American labor. It is pointed out that in recent years the Japanese have made tremendous forward strides in the matter of production methods, and with the cheap cost of labor in that country domestic manufacturers stand little chance of offering real competition without serious reductions in wages paid to the rubber workers in this nation.

In the general sundries division of the industry manufacturers expect a slight leveling off during the next few weeks and a seasonal letdown of larger proportions during July and early August. They also state that while activity is not up to that shown at this time a year ago, the pace has been steadier and may level off so that the total activity will equal that of 1934. Plants have virtually completed production of golf balls for the summer trade and have only a few more weeks to work on bathing accessories. Manufacturers of rubberized thread are continuing at a moderate pace, estimated by one official at about 65% of capacity. Some pickup has been noted in the demand for mechanical roll coverings and industrial tank linings. In the case of these two products, however, it is pointed out that business is likely to be spotty since orders are generally large, but intermittent. One large order is enough to keep a plant busy for some time, and two or three at once would create a temporary rush. The rubber toy industry is reported to be in a satisfactory position following the recent show at New York. Prices, though, are scheduled somewhat lower. In the hospital supply section has been noted a tendency on the part of some companies to cater more to the cheaper lines, but others are holding to the quality field in the belief that when business takes a turn for the better, they will be repaid for their patience.

According to the monthly report of the Brown Bureau of Business Research the manufacturing payrolls in Rhode Island during April were 1.6% larger than in the corresponding period of 1934, but were 3.1% smaller than during March. The total payrolls for April in the state, as compiled from payroll withdrawals from banks, amounted to $12,598,359. In the rubber industry the total payrolls were $223,353, a decrease of 8.5% from March and 21.3% from April, 1934.

The United States Army quartermaster corps recently awarded contracts to the Firestone Footwear Co., Boston, Mass., and the Goodyear Rubber Co., Middletown, Conn., for boots and overshoes to cost $78,437.95, and to United States Rubber Products Co., Inc., Naugatuck, Conn., for $409,721.72. These contracts cover 19,532 pairs each of rubber knee-high boots and hip-length boots and 380,625 pairs of overshoes, all for the CCC men.

The Davidson Rubber Co., Boston, Mass., supplies the local breweries with pure balata tubing, ⅛-inch inside diameter and ½-inch outside diameter, for filling cold beer into barrels from the cooling tanks. Uncompounded purified balata is perfectly adapted for such service because of the low temperature of the beer and the freedom of contamination or odor from the tubing.

United Shoe Machinery Corp., Boston, Mass., has reported that its activities during the past year have been about normal. Continued attention and expense have been given to experiment and research on the development of machinery and appliances advantageous to footwear manufacturers.

Cambridge Rubber Co., footwear manufacturer, Cambridge, Mass., has announced a new sub-branch office, Cambridge Rubber Sales Corp., Broadway and Prince St., St. Paul, Minn., with Frank T. Denny manager in charge. This branch is associated with the Chicago, Ill., branch at 317 W. Monroe St., where J. S. Weare is manager in charge. Cambridge Rubber Co. looks forward to an increased business on its standard light and heavy weight lines as well as its original styles and also expects an unusual summer placing of business (advanced fall buying) as compared to a year ago.

Cotton Fabrics for Rubber Goods

Basic information on cotton textiles for the rubber industry, such as ducks for hose and belting, chafer fabrics, sheetings, drills, etc., is readily accessible in the "Handbook of Industrial Fabrics" of Wellington Sears Co., 65 Worth St., New York, N. Y. The technical assistance of its engineering staff is also available to manufacturers in the solution of any specific problem involving the use of cotton fabrics in the rubber industry.

OBITUARY

Sales Manager

ROBERT HURSH, associated with The New Jersey Zinc Co., 160 Front St., New York, N. Y., since 1907, died suddenly on May 13 of a cerebral hemorrhage. He was successively engineer-in-charge at Mexico, with headquarters at Monterey, Mexico, 1907 to 1914; assistant manager of the Colorado activities of the company, 1915 to 1922; and district sales manager for the Pacific Coast, 1922 to 1925. He came to the company's sales headquarters in New York in 1925 and was sales manager of the pigment division at the time of his death.

Mr. Hursh was born in Cambridge, Mass., in 1885. He was graduated from the Massachusetts Institute of Technology in 1906.

He was a member of the New York Paint, Varnish & Lacquer Association, the Drug & Chemical Club of New York, Phi Kappa Sigma fraternity, and the Westchester Hills Golf Club. He was an ardent golfer and fisherman.

Surviving are his wife, one sister, and two brothers.

Services were held at his home at Bronxville, N. Y., May 15, and interment was at Mt. Auburn Cemetery, Cambridge, Mass., May 16.

Former Superintendent

THOMAS HUNT, SR., 75, former superintendent of the Hamilton Rubber Mfg. Co., Trenton, died May 11. Born in Boston, he came to Trenton when but 5 years of age. He was affiliated with the Hamilton company for several years and later was employed by the Pennsylvania Railroad Co.

He retired from active work about twelve years ago.

Surviving are two sons.

Interment was in St. Mary's Cemetery, Trenton.

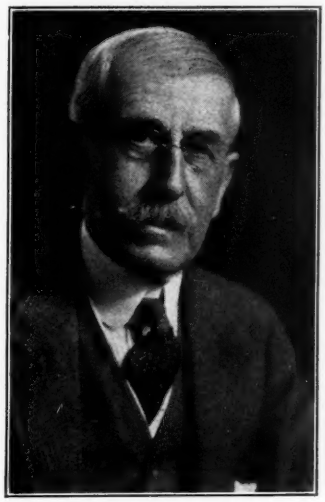
Rubber Chemist

EDWIN H. GRAFTON died May 11 at his home in Trenton from a sudden heart attack. He retired four years ago, relinquishing his place as a rubber chemist with the Vulcanized Rubber Co., Morrisville, Pa., where he had been in charge of the laboratory four years. Prior to that time he had been president of the Whitehead Bros. Rubber Co., Trenton, and before that was head of the insulated wire department of the John A. Roebling's Sons Co., Trenton.

Born at Carlisle, England, 67 years ago, he went to sea for several years as electrician on a cable-laying boat before coming to the United States.

He leaves a daughter, two sons, a brother, and a sister.

Burial was in Greenwood Cemetery, Trenton.



Henry F. Wanning

Farrel Executive

HENRY F. WANNING, who died in Shelton, Conn., April 28, was a director and member of executive committee of Farrel-Birmingham Co., Inc., Ansonia, Conn., and president of the former Birmingham Iron Foundry.

He was born in Webster, Mass., March 30, 1846, and began at a very early age to earn his living in his native city. Soon he moved to New York, where he secured work with the New York Steel Co. Then, on September 30, 1865, he came to Derby, then Birmingham, and started with the Birmingham Iron Foundry as bookkeeper. His marked ability earned him successively the offices of secretary, treasurer, and vice president. In 1891 he was elected president, which he remained for thirty-seven years. At this time, 1927, occurred the merger of his company with the Farrel Foundry & Machine Co., Ansonia. Mr. Wanning was a director and a member of the executive committee of the directorate in the new corporation, Farrel-Birmingham Co., Inc., until his death.

Mr. Wanning's business interests were not confined to the iron foundry. On April 5, 1887, he was elected a director of the Birmingham National Bank; he became vice president June 9, 1913, and president November 10, 1925. He resigned as president and was elected chairman of the board January 13, 1931. On October 5, 1901, he was named a trustee of the Home Trust Co. He was elected vice president October 1, 1913, and president October 1, 1924. He remained president just one year, but continued as a trustee until his death.

Mr. Wanning for many years was affiliated with the Second Congregational Church of Derby. He was a member of the Engineers' Club of New York, Quinnipiach Club of New Haven, and of the Derby and Shelton Board of Trade.

He is survived by one daughter, eight grandchildren, six great-grandchildren, and one sister.

Funeral services were held from the late home on April 30, with interment in Oak Cliff Cemetery, Derby. The honorary pall bearers were business associates, and the active pall bearers former employes of the Birmingham Iron Foundry.

Company Foreman

A SUDDEN heart attack on May 6 caused the death of Anthony Beiler, 49, foreman at The B. F. Goodrich Co., Akron, O., where he had worked seventeen years. He was also a member of the Foremen's Club there.

Surviving are his wife, a son, a daughter, two brothers, and a sister.

Funeral services were held May 9 at St. Bernard's Church. Interment was in Holy Cross Cemetery.

Goodrich Salesman

ON MAY 1, Leonard Burton Cooley, of the sales staff of The B. F. Goodrich Co., Akron, O., died from a sudden heart attack. Mr. Cooley joined the Goodrich advertising department in 1925 and a year later was appointed advertising manager of the Akron district. In 1932 he was named advertising and sales promotion manager of the north central district of the company. The next year he joined the sales staff of the Cleveland district.

The deceased was born forty-one years ago in Columbia, O., where he attended grade school. Later he was graduated from a Cleveland high school.

He was a veteran of the World War and served with the 608th Engineers in France. He belonged to the American Legion, F. & A. M. of Cleveland, Cleveland Advertising Club, Trinity Lutheran Church, and Summit Voiture, 40 & 8.

Mr. Cooley leaves his wife, two children, his parents, a brother, and a sister.

Funeral services were conducted May 3. Burial was at Columbia.

J. R. Weir, agricultural research department, Ford Motor Co., recently returned from advising on the Ford rubber plantation in Brazil, states that some 10,000 acres are already planted and planting is still going on. A second concession on what is known as the "Plateau," which is very level land, has been opened where the clones brought from the East by Mr. Weir are being developed along with local rubbers. The original Ford plantation is known as "Boa Vista;" the new one is at Bellaterra. Both are located on the east bank of the Tapajos River.

MIDWEST

PRODUCTION in the automobile industry in April was over 100,000 cars and trucks a week. Schedules indicate a probable output for United States factories of more than 450,000 units, which will mean a production of over 1,500,000 vehicles for the first four months of the year, or more than the output of the industry for all of 1932. Weekly production figures and reports of stocks of dealers suggest that a production peak was reached the latter part of April for most leading manufacturers. Stocks of used cars are increasing, with prices tending downward.

The strike in the industry last month, of course, upset schedules in general. Machine-tool builders and dealers, however, reported that orders for machine tools continued large during the labor trouble.

Rainfall in the drought area has changed the crop picture decidedly for the better.

Baum's Metal Specialties, 1523 Wyandotte St., Kansas City, Mo., manufactures dies, machine construction, gears, models, brass work, patterns, castings, screw machine products, experimental work, stampings, and vulcanizing molds to order.

Ford Rubber Co. has moved to 338 North Water St., Milwaukee, Wis.

The Chicago Rubber Clothing Co., Racine, Wis., has transferred its Chicago, Ill., office to Room 801, Merchandise Mart, where a complete line of the company's products is on display. C. A. Anderson is in charge.

Tire Price Changes

Sears Roebuck & Co. and Montgomery Ward & Co., mail order houses, both of Chicago, Ill., recently advanced retail prices of automobile tires 6 to 7%, amounting to from 45 to 65¢ on each tire. Officials said the increases were to stabilize prices following an understanding reached with the tire industry.

Leading tire manufacturers effected an increase of 10% in their discounts to dealers beginning May 7. This action of moving up discounts to the trade 10% lowers the profit margin close to the basis which prevailed last year prior to the general advance in price lists.

It was reported that the Firestone Tire & Rubber Co., Akron, O., would continue to offer tires corresponding to mail order products at the prices quoted by the latter at retail stores; also at a number of centers where the mail order organizations were making trade-in allowances on old tires, Firestone would meet this competition by offering similar allowances to buyers.

The Goodyear Tire & Rubber Co., Akron, manufacturing tires for one of the large mail order houses, was said to be engaged in offering contracts to oil refining and marketing concerns for the sale of special-brand tires.

E. R. Waite

Chemical Engineer

E. R. Waite, chief chemist and development and sales engineer of the Sheller Mfg. Corp., Portland, Ind., manufacturer of steering wheels and hard rubber compositions, was born September 6, 1894, at Falmouth, Me. He attended the public schools at Portland, Me., and the University of Michigan, which awarded him a B.S. degree in 1916. He then continued his studies for another year at the Graduate School of the university.

From 1917 to 1921 he worked in the chemical department of The Goodyear Tire & Rubber Co. and from 1921 to 1923 in that of the Firestone Tire & Rubber Co., both of Akron, O. Next he was in charge of the service laboratory of The Rubber Service Laboratories Co., Inc., Akron, but in 1925 was transferred to the sales organization. Five years later he joined the Sheller concern.

Mr. Waite holds membership in the American Chemical Society, Phi Lambda Upsilon, Portland Country and Kiwanis clubs, and F. & A. M.

Dryden Rubber Co., 1014 S. Kildare Ave., Chicago, Ill., manufacturer of miscellaneous mechanical goods, reports its plant very active, working three shifts. President George B. Dryden has announced the following additions to its executive staff: U. L. Harman, vice president, J. W. Robertson, and C. P. Hawkins. Mr. Harman entered the rubber industry in 1921 as factory comptroller for the Mason Tire Co. and later as assistant manager of the mechanical rubber goods division of the Firestone Tire & Rubber Co. He joined Dryden early in 1935. Mr. Robertson, development engineer, also handling sales engineering, started in the rubber trade in 1920 in the technical division of the Miller Rubber Co. In 1924 he was with the Firestone mechanical rubber division, handling development and sales engineering. Mr. Hawkins joined Firestone in 1926 as time study specialist. He later spent 4½ years as superintendent of Firestone's British plant. Shortly upon his return here he joined the Dryden company.

William O'Neil, president of The General Tire & Rubber Co., Akron, O., recently attended a sales conference in Minneapolis, Minn., of about 150 Midwest retail distributers. In the course of his address to the gathering, at which sales and advertising plans for the year were discussed, Mr. O'Neil stated that increases in the price of silver will indirectly raise the cost of rubber. Accompanying the General president to the conference were E. F. Parker and C. J. Durban, sales executives of the company, and Frank Gable, of the factory engineering department. General Tire sales so far this year are better than the 1934 figures.

Monsanto Chemical Co., St. Louis, Mo., at a special stockholders' meeting, May 3, approved the merger of The Swann Corp. with and into the Monsanto company, which merger will become effective on the filing of the necessary papers with the Office of the Secretary of State of Delaware, in which state the companies are incorporated. Prior thereto the Swann directors and stockholders approved the merger, which is on the basis of one share of Monsanto Chemical Co. stock for each 4½ shares of The Swann Corp. stock. Swann and its subsidiaries operate manufacturing plants in Anniston, Ala., St. Louis, and Camden, N. J., and are principally engaged in the electrochemical production of phosphoric acid and its derivatives, calcium carbide, ferro phosphorus, and abrasives.

A.S.T.M. Meeting

The thirty-eighth annual meeting of the American Society for Testing Materials will be held in Detroit, Mich., June 24 to 28, 1935, at The Book-Cadillac Hotel.

A session of unusually wide interest, on Tuesday evening, will be devoted to a symposium on the place of materials in automobile roads and rides, which will stress the important part that materials play in automobile roads and rides, a discussion of the problems relating to materials in this field, and an indication of further advances which appear desirable and which the future may reasonably hold. The papers and their authors follow: "The Road," John S. Worley, professor of transportation engineering, University of Michigan; "The Tires," K. D. Smith, technical superintendent, tire division, The B. F. Goodrich Co.; "The Car," Wil-

(*Continued on page 68*)

Rubber Industry in Europe

GREAT BRITAIN

R.G.A. Meeting

Discussing new avenues of consumption at the annual general meeting of the Rubber Growers' Association, the retiring chairman, James Fairbairn, stated that though much had been done to make leaders of important industries more rubber-minded, much remained to be done. The field for extending the uses of rubber is very large indeed. Thus, although the automobile industry already absorbs a considerable amount of rubber in tires, a very substantial increase in consumption would result if every car were fitted with rubber seatings since a complete set for a car takes up 15 to 25 pounds of rubber.

Mr. Fairbairn next referred to the excessive taxation with which rubber growers in Malaya were burdened and assured his hearers that unremitting efforts would be made to have taxes reduced.

As to restriction, he thought that while it has been successfully launched and equipped, it had not yet really got to sea, so to speak, but he had no doubt that in time it would put the rubber industry on a sound basis. He prophesied greatly increased absorption of rubber in the future, but the supply would depend, among other factors, on the continuance, or otherwise, beyond 1938 of the International Rubber Regulation Agreement including restriction of new plantings. He hoped that by 1938 the scheme would have been found so necessary to the welfare of the industry and all those connected with it that it would be renewed for a further period.

The chairman for the coming year is Robert Stewart, of Lyal Anderson & Co. T. J. Cummings was elected vice chairman, and the retiring members of the council were reelected.

Latex Processes

The various processes employed in the utilization of latex were discussed by D. F. Twiss, of the Dunlop Rubber Co., Ltd., in his lecture on "Rubber Latex as a Manufacturing Material," recently held before the Royal Society of Arts, London. After reviewing the history of dipping in latex from the primitive methods of the natives in South America down to the present, Mr. Twiss dealt with the modern methods of dipping, spreading, molding, electro-deposition, etc. In connection with the latter he explained how deposits up to 1 cm. thick could be rapidly built up on a zinc anode; how hollow goods were produced on porous formers around the anode; the precautions to be taken to prevent concurrent liberation of gases at the anode, etc.

For molding, he stated, latex could be reduced to a dry crumb or a powder; or it could be coagulated in a mold and if a sufficient amount of sulphur was present and the latex cured to the ebonite stage under circumstances preventing the loss of contained water, then after drying, a light brown microporous ebonite would result which retained the dimensions of the mold. Any degree of microporosity could be secured by proper selection of the concentration of the latex.

Frothed latex yields a remarkably uniform sponge and, as is known, is molded to produce cushions, seats, mattresses, as well as simple small articles, in fair variety. By dipping in frothed latex, articles with a sponge rubber cover are obtained; the frothed latex can be spread on the backing of carpets to form a soft resilient under-surface. Finally, it is also formed into molds for producing ornamental cement castings for gardens.

Rubber Research

The greatest strides in research in the cultivation of rubber have been made during the last ten years, said J. Grantham, former director of research for the estates of the United States Rubber Co., in a lecture in London at the Royal Society of Arts. While the rubber planting industry in the Far East, responding to the demands of the automobile industry, has gone forward by leaps and bounds so that instead of the 127,000 acres of rubber of 1905 we now have about 8,000,000 acres, research work on cultivation has proceeded relatively slower. Selection work is only slightly more than fifteen years old and as yet affects only a small proportion of the total planted area. But its achievements have perhaps been the most striking in the research field of the industry. To illustrate the careful and assiduous work required in selection, the fact may be quoted that on a certain area of 12½ acres records have been kept regularly since 1917 of the dry rubber yield of every single tree on the area. This work has among others led to the observation, so important for selection, that a good yielder usually remains a good yielder over a number of years although, of course, occasional exceptions appear.

With regard to manuring, widely differing results have been obtained; while in some cases the benefits accruing have been inconsiderable, in others marked improvement has resulted. Thus the regular application of nitrogenous manures on white soil in East Coast of Sumatra has in one instance raised the yield from 321 pounds per acre in 1917 to 757 pounds in 1929.

Cause and Effect

Because prohibition ends in America, manufacturers of tennis rackets in England have to find a substitute for gut for stringing purposes, and the rubber industry benefits. This statement is not so crazy as it sounds. It seems that a shortage of natural gut exists largely resulting from the increased demand for "wienies" and the like to go with the more potent beverages once more permitted in America. And Dunlop has met the situation by producing an imitation gut, called "Speed String," made of silk and latex. The new string is said to have several advantages over natural gut: it is cheaper, impervious to moisture, where natural gut is spoiled by dampness, more enduring, and does not become slack in use. Almost 50% of the 130 miles of string annually used in Dunlop rackets now consists of "Speed String." Incidentally, it is suggested that the new string should be suitable for use on cellos.

British Notes

At the fifteenth annual meeting of the Research Association of Rubber Manufacturers, Alexander Spencer, of George Spencer, Moulton & Co., was elected president for the ensuing year. J. H. Mandleberg is the chairman. The vice presidents were reelected, with J. Sealy-Clarke, retiring president, and H. H. Burton taking the places of Alexander Spencer and the late Sir George Sutton.

James Lyne Hancock, Ltd., is to come under control of the British Tire & Rubber Co., formerly the British Goodrich Rubber Co. The Hancock firm has been in difficulties for some time. Last year, although production was 135% up on 1927, a loss of over £3,000 occurred on the year's working. Considerable expense has been incurred in installing new machinery, but good orders are on hand, and it is expected that with the financial backing of the British Tire company, future developments will be satisfactory.

Dunlop Rubber Co., Ltd., for 1934 reported a net profit of £2,285,519, including proportion of profits, less losses, of subsidiary and sub-subsidiary companies, and after providing for depreciation and other charges. This compares with a net profit of £2,346,644 in 1933. After deducting guaranteed preference divi-

dends of subsidiaries paid by such companies and foreign taxes of subsidiaries, the company's proportion of special appropriations and undistributed profit of the year held in reserve by subsidiaries, debenture interest, and other charges, there was a profit for the year of £1,687,687 before taxes, compared with £1,512,866 in the preceding year.

Germany

While total German exports of rubber goods declined both in quantity and value during 1934, the increase was marked in exports of tubes and tire casings for motor vehicles, the shipments of the former being 112,883 against 99,104, and of the latter, 173,897 against 130,798. The tire purchases of several countries including British India, Netherland India, Greece, Jugoslavia, Portugal, Sweden, and Holland showed substantial increases as compared with the preceding year; those of Holland are particularly notable, 52,455 against 25,588 the year before, or almost one-third the total tire exports against less than one-fifth. On the other hand Czechoslovakia, France, and Switzerland sharply reduced their purchases.

The sources of the imports of tire casings, which rose from 14,921 to 25,644, show some interesting changes. Whereas in 1933 Belgium was the main source of supply, sending over 40% of the total, her share was comparatively unimportant in 1934 when Austria, Great Britain and the United States together sent about five-sixths of the whole; the increase in the 1934 shipments over those of 1933 was especially marked in the case of Austria and the United States.

Both imports and exports of cycle tubes fell, the former from 13,382 to 7,028, and the latter from 410,283 to 357,870.

Similarly with rubber footwear, exports of which fell from 727,693 to 545,508 pairs, and imports from 66,215 to 19,769 pairs. Holland continues to be the chief buyer of German footwear, followed by Belgium and Sweden. The drop in the footwear imports is in reality not so steep as the figures would indicate since in 1933, 29,065 pairs, or about 45% of the total imports, consisted of returned goods; whereas in 1934 only 2,314 pairs were returned.

Declines were also noted in the exports of hose, from 9,772 to 8,845 quintals; belting, from 2,512 to 1,546 quintals; packing, from 1,465 to 1,184 quintals; uncovered rubber thread, from 2,870 to 2,146 quintals; and other soft rubber goods, from 68,360 to 57,124 quintals.

The much-regulated rubber industry has recently been informed of new maximum prices for old and waste rubber. In some cases the new prices are higher, in others lower than before; no fewer than forty-one items are covered.

To save on cotton, new rules have been announced regarding the braiding of insulated wires and cables. Thus manufacturers may no longer cover rubber-insulated wires up to 6mm.^{2} with cotton braidings. Those over 6mm.^{2} may still be covered with cotton, but the mesh must be so open as to effect a saving of 30% in the amount of cotton used as compared with former standards.

At the general meeting of the Deutsche Kautschuk Gesellschaft held at Dresden, May 30 to June 1, 1935, inclusive, the following papers were read: "Tactics of Patent Protection," by C. Boehmer Edler von Bornegg, Berlin; "The Technical Valuation of Crude Rubber in the Rubber Factory," R. C. Rubel, Hannover; "Experiences with Glue as Working Material," G. Goll, Berlin; "Instructive Points from the History of the Manufacture of Rubber and of Compounding Method," Werner Esch, Hamburg; "Modern Possibilities in Drives for Machines in the Rubber Industry," Grunwald, Berlin; "Modern Measuring and Regulating Devices for Rubber Factories," Buchting, Berlin; "The Modern Press—Stamp Process in the Rubber Industry," S. Dorogi, Budapest; "The Field of Latex Manufacture," H. Miedel, Frankfurt a.M.; "Some Phases of the Development of a Latex Industry," Paul Klein, Budapest; and "Chlorinated Rubber as Raw Material for Technical Purposes," A. Nielsen, Hamburg.

France

A new type of automotive rail-car, built by Etablissements Fouga of Beziers after Dunlop patents, recently made a trial trip from Paris to Montlucon. A number of persons prominent in government, railway, industrial, and financial circles attended, some riding in the new car, and the rest in the special train which followed the Dunlop-Fouga "automotrice." This has been constructed with the fact in view that a vehicle consists of a delicate part, including the motor and transmission parts, and a more sturdy part, including the chassis, heavy axles, etc. Consequently two sets of wheels are provided, one, with pneumatic tires for the first and more delicate part, and railway wheels for the heavier, sturdier part of the car. In this way it is sought to insure perfect stability and at the same time a certain flexibility.

A new apparatus for determining the aging of a number of products as rubber, leather, paper, silk, has been devised by Paul Walter. The method, in which gases and ultra-violet rays are used simultaneously, seems to be particularly suited to test rubber as it permits fairly rapid determination of the behavior of rubbers of different composition in the presence of oxygen, which under the action of ultra-violet rays is converted into ozone with its well-known deteriorating effect on rubber. The apparatus consists of a bomb containing a mercury vapor lamp emitting ultra-violet rays. After the test piece is placed in the bomb, the gas or mixture of gases, whose action it is desired to study, is introduced into the bomb up to a pressure of 2kg./cm.^{2}, if required.

France experienced a considerable set-back in her foreign rubber business during 1934 as compared with 1933. Not only did the imports of crude rubber, balata, and gutta percha fall from 710,296 to 691,589 quintals, but imports of manufactured goods decreased almost 19% in quantity and not less than 29.4% in value; while exports fell 18.8% in quantity and over 23% in value. The imports, which totaled 6,766 tons, value 76,167,000 francs, against 8,340 tons, value 107,757,000 francs, showed particularly heavy declines in all types of rubber footwear, the 1934 totals having been 308,310 pairs, value 2,642,000 francs, against 563,352 pairs, value 5,135,000 francs. The most important item, pneumatic tires and tubes, dropped from 52,797 quintals, value 48,177,000 francs, to 42,870 quintals, value 39,406,000 francs. Rubber thread was the only article of importance to show an increase; the extra purchases came from the United States and from other countries not specified. The total exports of rubber goods were 12,538 tons, value 174,098,000 francs, against 15,456 tons, value 226,463,000 francs. About half these exports went to the French colonies. The decline in the export business to these colonies was less severe than to foreign countries.

A new classification with a general duty of 40 francs per kilo (formerly 124.80 francs) and a minimum duty of 10 francs per kilo (formerly 31.20 francs) has been established in the French tariff on rubber aprons and capes ("pelerines") either printed or not, by a law of March 22, 1935, published in the French "Journal Officiel" for March 23 and effective immediately. Imports from the United States are dutiable at the general rate under this item.

European Notes

The Danish import duty on rubber boots has been reduced from one crown to 0.50-crown per net kilo, effective from July 1, 1935, to June 30, 1936.

Tire distributers in Turkey expect larger sales during the coming season than in the corresponding period of 1934. Anticipated increases in the movement of crops and automotive transport traffic are expected to cause larger sales of automotive vehicles, tires, and replacement parts. The opinion prevails that tire sales should increase between 25 and 30% in 1935 over 1934.

In view of the fact that the United States enjoys most-favored-nation treatment in Turkey and the trade balance between the two countries is in favor of Turkey, thus obviating the necessity of exchange restrictions being applied to imports from the United States, tire exporters in the United States would seem to be in an excellent

(*Continued on page 68*)

Rubber Industry in Far East

MALAYA

Hauser in Singapore

Prof. E. A. Hauser, of the Semperit Austro-American Works, Ltd., Vienna, Austria, who is on a round-the-world tour to obtain first-hand information on the rubber situation in various countries, landed in Singapore early in April. Interviewed by the *Straits Times,* he expressed himself optimistically about the outlook for rubber both from the plantation and the manufacturing point of view, although he believed that the market was too excited about things (the European situation, for instance) that should have very little bearing on the rubber industry. He noted the steady progress made in the direct application of latex, more especially in Central Europe, America, and now also in Japan. He was much impressed by the developments in Japan, which he considered absolutely unique. Japan is going ahead steadily in the rubber industry, and trade barriers will not lessen to any extent her rubber consumption.

Road Surfacing Experiments

Before a gathering of the Engineers' Association of Malaya, held at Singapore, H. W. Cowling, of Gammon, Malaya, explained the technique and advantages of his system of building rubber macadam roads with the use of the latex mixture known as Malaytex. The chief problem in obtaining satisfactory road surfaces was that of anchorage, he pointed out. After much experimentation he found that this was best achieved by providing a stable compact under-surface of pre-coated stone, in which the stones touch, yet leave a sufficiency of voids so that the rubber mixture, when poured on, can penetrate and key itself to the stone. In this way a gradual transference from stone to rubber is obtained. The rubber paving may be built up to any thickness above the stone. However, when it is desired to have a carpet surface, the minimum thickness of this carpet should be ½-inch where there is horse traffic, and ¼-inch where there is no horse traffic. A terrazzo effect is produced when the rubber mixture is floated into the spaces in the stone surfaces and brought flush with the stone.

What Malaytex actually consists of was not stated beyond the fact that it contains latex, various fillers, curing agents, and other ingredients, all such as are readily and cheaply obtainable in large quantities in all important countries.

Mr. Cowling has succeeded in preserving the mixture ready to lay, and it appears to be available packed in drums ready for use. He claims that it dries rapidly without cracks and shows the necessary degree of hardness, strength, and resistance to deformation and abrasion when dry, presenting a non-skid surface that does not become sticky in hot weather. Quite recently he completed an experimental area of 1,000 square yards in a section in Singapore that is subject to especially heavy traffic. Here he has tried out five variations of pre-coated stone and eight variations of the technique of laying the rubber mixture and its top finish.

With the proper equipment, he estimates that a rubber macadam surface can be laid for $2.50 (Straits currency) per square yard, complete with stone undersurface. The price of a ½-inch carpet, without the undersurface, is about $5 per square yard. Mr. Cowling has already put down several stretches of rubber macadam and rubber carpet in Denmark, France, and England, and from the latter country it is reported that rubber macadam laid in Gerrards Cross is doing well after two winters and a summer.

Latex Exports

The rapid growth in the world demand for latex is amply shown in the table below which includes, besides official statistics of United States gross imports of latex, the net exports of latex and latex concentrates from Malaya, Netherland India, and Ceylon, as issued by the International Rubber Regulation Committee. The figures represent the dry rubber content in long tons.

	Net Exports				
Year	Malaya	Neth. India	Ceylon	Total	U. S. Imports
1925....	3,618	2,239	6	5,863	3,268
1926....	3,261	43	20	3,324	3,388
1927....	2,634	83	0	2,717	1,116
1928....	2,247	1,395	1	3,643	4,167
1929....	3,574	1,437	2	5,013	3,728
1930....	2,750	2,744	11	5,505	4,450
1931....	1,940	3,784	2	5,816	4,649
1932....	5,193	3,488	2	8,683	5,084
1933....	10,470	5,260	1	15,731	11,085
1934....	14,172	5,391	3	19,566	13,070

The insignificance of Ceylon as a producer of latex strikes at the first glance. In the Netherland India column, the almost complete cessation of exports in 1926 and 1927 leaves a conspicuous void; from 1928 on, however, exports have, with an almost negligible exception, increased regularly from year to year. Malayan outputs exceeded those from Netherland India in every year except 1931 when there was a noticeable slump in shipments. But this was more than made up for the following year when Malaya shot ahead again. During the next two years the rapid rate of increase continued so that whereas Malaya accounted for only 50% of the total latex shipments in 1930, in 1934 her share in these exports had mounted to 72.4%.

The figures of the United States imports show comparatively little development in the rate of consumption of latex to 1929. A definite change set in in 1930, and by 1934 the demand for latex had become four times as great as the average over the years 1925 to 1929 inclusive.

That the increased demand for latex is not confined to the United States is evident from the fact that whereas during 1925 to 1928 inclusive America imported 76.8% of the total shipments, the imports of 1933 to 1934 represent only 68.4% of the total, indicating that rapid as the increase in the use of latex has been in America during the last few years, the rate of increase in other countries has been relatively greater.

Small Companies Should Amalgamate

Nearly one-third of the British rubber producers in the East comprises smaller, high-cost companies whose existence, once control is removed, will become precarious, says F. J. Tompsett in *British Malaya.* These concerns are high-cost producers not only because of the quality and situation of their estates, but more particularly because they lack efficient and up-to-date methods of cultivation and at the same time are burdened with excessive overhead charges in London and in the East.

Control is only a temporary measure which must end sooner or later, when these companies will face a real struggle for existence in which they will be losers unless they avail themselves of the respite offered by control to set their house in order. Mr. Tompsett advises that the first and most important step toward attaining a lower cost is for these companies to amalgamate wherever possible into larger units. He realizes the difficulties in the way of such a move, but suggests that in view of its urgency the situation should be considered without delay by those interested and every effort made to bring directors of any company together where amalgamation appears to be desirable or obviously necessary.

NETHERLAND INDIA

Restriction Quotas

The export quota for native rubber during the second quarter of 1935 has been fixed at 29,200,885 kilos dry rubber. Of this amount the share of those districts where the special export duty is retained will be 25,229,822 kilos; the balance will be distributed among the districts now under individual restriction, as follows: Banka and Dependencies, 254,148 kilos; the Tandjong-Pinang district of Riouw and Dependencies, 136,605 kilos; Tapanoeli, 1,073,775 kilos; East Coast Sumatra, 1,775,860 kilos.

Preliminary statistics for the first three months of 1935 show that estates are again considerably behind their quotas although the difference has been diminishing from month to month. The January shipments were 5,649 tons short of the quota, which for the present works out at 14,812 tons a month; those for February were 3,977 tons short, and for March, 1,228 tons, in all 10,854 tons.

Exports of native rubber during the same period have been very variable: in January they were 9,805 tons, or 783 tons below the monthly quota of 10,588 tons; in February they soared to 17,145 tons, 6,577 tons above quota; in March exports dropped to 9,085 tons, or 1,503 tons short. Up to the end of March, then, estates were short 10,854 tons, and native rubber 4,271 tons over quota so that in the end shipments from all Netherland India fell about 6,500 tons short of quota during the first quarter of 1935.

Exports in 1934

During 1934 total exports of rubber from Netherland India came to 384,993,190 kilos, or 378,911 long tons. The exports were classified as follows:

	Java and Madura	Outer Possessions
Latex	48,733	5,365,871
Sprayed rubber	.....	10,768,960
Sheets, duty-free	88,280,387	93,950,875
Sheets, dutiable	118,690	49,175,674
Other, duty-free	131,411	853,305
Other, dutiable	.....	4,842,286
Slab rubber, dutiable	.....	131,456,998
Totals	88,579,221	296,413,969
Long tons	87,180	291,731
Grand total	378,911	

Cost of Production

In comparing costs of production in Malaya and Netherland India it has often been assumed that the fact that the latter is still on the gold standard places it at a considerable disadvantage. This point may be so to a certain extent, but an examination of labor costs in the two countries would suggest that the advantage in the matter of currency should not be over-estimated. While wages for labor have increased all over Malaya, and in certain sections even to a very marked degree, those in Sumatra have actually been reduced by 2 guilder cents a day. This reduction, effective March 1, 1935, was recommended by the A.V.R.O.S. on the strength of analysis of the coolie's budget which, it seems, has of late shown a reduction because of lower costs of certain staples. Not only is the coolie paid less in Sumatra, but also the European staff on many estates is paid on a lower scale than is general in Malaya. Incidentally, these facts are being utilized in Malaya by rubber producers in efforts to obtain a reduction in quit rents.

Machinery for Granulated Rubber

It is learned that one of the most important rubber producers in Sumatra has ordered Gebr. Stork & Co., of Holland, to construct a complete installation for the production of granulated rubber. The success of tests in Holland and Ceylon with machines supplied by this firm is said to have led to this order.

Siam

While, in view of the recorded rubber exports in recent years, the original quota allotted Siam by the International Rubber Regulation Committee was considered generous, Siam, trading on her strategic position, demanded more and had her quota raised to 40,000 tons.

Cables from England express the opinion that Siam cannot fill her quota, at any rate for some years to come, so that the concession is in the nature of a sop to keep Siam quiet and good and can do nobody else harm. It is conceded that there may be a certain amount of smuggling from northern Malaya into Siam, but this is not expected to take on proportions worth considering.

In the East the situation is viewed in a slightly different light. *The Times of Malaya*, discussing the matter editorially, considers there is a real danger of smuggling springing up on the northern borders of Malaya once the price reaches a really remunerative value. It is also disturbed about the effect the big concession to Siam may have in Dutch native rubber circles and considers the likelihood of agitation for a similar concession by Dutch natives.

The usually well-informed Siam correspondent of *The Times of Malaya* states that in the Peninsula all lands suitable for rubber are being planted up as fast as possible. In Siam itself opinion as to whether she will be able to fill her quota is divided with a leaning to the view that she can, possibly influenced by the knowledge that there are numerous scattered small holdings besides the better known estates owned by Chinese and others.

Ceylon Rubber Exports

Rubber exports from Ceylon in 1934 totaled 79,713 long tons, value 56,615,226 rupees, against 63,534 tons, value 22,995,245 rupees, in 1933. The United States was by far the largest taker, buying 35,205 tons, value 24,952,372 rupees, last year, compared with 33,392 tons, value 11,752,686 rupees, the year before.

Philippine Rubber Exports

Crude rubber exports from the Philippine Islands in 1934 came to 450 long tons, 84% more than the 245 tons in 1933. Production of rubber in the Philippines first assumed importance in 1926, with exports of 225 tons. Each succeeding year witnessed increasing exports until 1930, the high year, with exports of 379 tons of rubber. Low market prices for rubber prevailing in the period 1930 to 1933 made rubber production unprofitable in the Philippines, with the result that but 44 tons were exported in 1931 and none in 1932. Market prices for crude rubber in 1934 and thus far in 1935 were favorable to plantation rubber production, and it is very likely that exports of rubber from the Philippine Islands will increase in 1935 and 1936.

Canada

Canada's rubber export trade increased to almost $3,500,000 in the last fiscal year, according to the Dominion Bureau of Statistics, which reported principal items of export were pneumatic tire casings and rubber boots and shoes. During the fiscal year ended March 31 the value of rubber exports from the Dominion was $12,425,000, compared with $8,969,000 in the previous fiscal year. Exports of tire casings, which went to 79 countries, were worth $658,000, compared with $599,000 in the fiscal year ended March 31, 1934.

Rapid increase in Canadian imports of raw rubber from British Empire countries is shown. Imports of raw rubber last March totaled 6,071,000 pounds, of which 4,468,000 came from the United States; 1,298,000 from the Straits Settlements, 224,000 from Ceylon, and the rest from the Dutch East Indies. In 1934 the supply from the Straits Settlements rose from 182,000 to 8,242,000 pounds; while Ceylon started its Canadian rubber trade with shipments of 92,000 pounds.

Bata Rubber Footwear Co., Prague, Czechoslovakia, because of keen business competition, due partly to the new tariffs on goods entering the Dominion, has decided to open a factory in Montreal, according to William H. Herman, sales manager for the Rubber Trading Co., Montreal. The new factory should be in operation very soon. Mr. Herman sees good business prospects for 1935 in Canada.

Patents and Trade Marks

MACHINERY

United States

19,536 (Reissue). **Jar Cap Gasket Maker and Applier.** M. G. Parks, Dayton, O., assignor to Crown Cork & Seal Co., Inc.

1,995,385. **Temperature Responsive Device.** E. B. Foote, assignor to Taylor Instrument Cos., both of Rochester, N. Y.

1,995,429. **Rubber Soled Shoe Machine.** G. B. Laura, deceased, by M. Laura, heir at law, both of Saronno, Italy.

1,995,550. **Moisture Compensating Weighing Device.** D. C. Scott, Providence, R. I., assignor to Henry L. Scott Co., a corporation of R. I.

1,995,720. **Talc, Soapstone Applier.** V. Royle, Paterson, N. J.

1,995,767. **Continuous Fabric Rubberizer.** W. J. Dean, No. Kansas City, Mo.

1,995,892. **Tire Retreader.** F. J. Manning, La Grange, Ill.

1,995,913. **Shoe Cement Pot Device.** W. S. Anderson, assignor to Shoe Press Corp., both of Philadelphia, Pa.

1,996,051. **Rubber Goods Form.** D. F. Twiss, Wylde Green, England, assignor to American Anode, Inc., Akron, O.

1,996,072. **Rubber Goods Form.** A. S. King, Sutton Coldfield, England, assignor to American Anode, Inc., Akron, O.

1,996,073. **Rubber Goods Form.** P. Klein and F. Gábor, both of Budapest, Hungary, assignors to American Anode, Inc., Akron, O.

1,996,079. **Rubber Goods Form.** E. A. Murphy, Birmingham, England, assignor to American Anode, Inc., Akron, O.

1,996,129. **Tire Retreader.** W. B. Thurman, Berkeley, assignor to Super Mold Corp., Lodi, both in Calif.

1,996,491. **Tube Apparatus.** E. F. Schnedarek, Cuyahoga Falls, and T. J. Smith, Akron, assignors to General Tire & Rubber Co., Akron, all in O.

1,996,903. **Grinder and Polisher.** L. S. Castonguay, deceased, by J. A. Castonguay, administratrix, both of Cuyahoga Falls, assignor to Chemical Rubber Co., Cleveland, all in O.

1,996,971. **Tire Vulcanizer.** C. E. Murphy, Cuyahoga Falls, assignor to Mile-O-Tiser, Inc., Akron, both in O.

1,997,268. **Vulcanizer.** A. W. Scharpf, assignor of 1/3 to B. R. Hammes and 1/3 to W. R. Finn, all of La Crosse, Wis.

1,997,784. **Hollow Article Form.** C. L. Beal, Cuyahoga Falls, assignor to American Anode, Inc., Akron, both in O.

1,997,843. **Open-Work Material Producer.** J. E. Warrell, assignor to Pharis Tire & Rubber Co., both of Newark, O.

1,997,908. **Plastic Article Curer.** H. C. Lord, Erie, Pa.

1,998,161. **Continuous Article Vulcanizer.** T. M. Knowland, Watertown, assignor to Boston Woven Hose & Rubber Co., Cambridge, both in Mass.

1,998,391. **Cable End Stripper.** K. R. Shaw, assignor to United Elastic Corp., both of Easthampton, Mass.

Dominion of Canada

349,087. **Rubber Mixer.** E. E. Quinton, Birmingham, England.

349,428. **Elastic Yarn Apparatus.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of H. Z. Cobb, Providence, R. I., U. S. A.

349,472. **Trimmer.** United Shoe Machinery Co. of Canada, Ltd., Montreal, P. Q., assignee of C. G. Brostrom, Lynn, Mass., U. S. A.

United Kingdom

421,300. **Watchcase Vulcanizer.** D. Bridge & Co., Ltd., Castleton. (National Rubber Machinery Co., Akron, O., U. S. A.)

421,305. **Rubber Film Former.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands.

421,355. **Tire Vulcanizer.** D. Bridge & Co., Ltd., Castleton. (National Rubber Machinery Co., Akron, O., U. S. A.)

421,597. **Fabric Storage Apparatus.** Dunlop Rubber Co., Ltd., London, and H. Willshaw, Birmingham.

421,709. **Ball Mold.** Soc. Italiana Pirelli, Milan, Italy.

421,803. **Belting Apparatus.** Raybestos-Manhattan, Inc., Passaic, assignee of D. Repony, Clifton, and J. H. Matthews, Nutley, all in N. J., U. S. A.

422,020. **Rubber Thread Extruder.** J. H. Johnson, Toronto, Ont., Canada.

422,038. **Hot Water Bottle Mold.** J. Bourne & Son, Ltd., Denby Pottery, and W. Coulter, Stoke-on-Trent.

422,106. **Tire Groover.** P. Koster and Soc. Parisienne D'Outillage Electrique, both of Paris, France.

422,192. **Chlorinated Rubber Apparatus.** W. D. Spencer, Liverpool, and Imperial Chemical Industries, Ltd., London.

422,403. **Rubber Thread Apparatus.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands.

422,505. **Covering Machine.** Lastex Yarn & Lactron Thread, Ltd., London, and J. G. Healey, Birmingham.

422,582. **Watchcase Vulcanizer.** D. Bridge & Co., Ltd., Castleton. (National Rubber Machinery Co., Akron, O., U. S. A.)

422,910. **Tire Vulcanizer.** R. B. Day, Akron, O., U. S. A.

422,949. **Rubber Thread Apparatus.** E. Vincke, Palamos, Spain.

423,119. **Watchcase Vulcanizer.** D. Bridge & Co., Ltd., Castleton. (National Rubber Machinery Co., Akron, O., U. S. A.)

Germany

612,040. **Automatic Tire Inflater.** Edouard Dubied & Cie., S.A., Neuchatel, Switzerland. Represented by K. Ranfft, Berlin.

612,304. **Vulcanizing Press.** Deutsche Dunlop Gummi Co. A.G., Hanau a.M.

612,890. **Tool for Taking Off Tires.** H. Eichner and O. Knorn, both of Breslau.

PROCESS

United States

1,995,321. **Abrasive Article.** C. S. Nelson, Niagara Falls, and D. B. Sharpe, Tonawanda, assignors to Carborundum Co., Niagara Falls, all in N. Y.

1,996,880. **Golf Balls.** M. B. Reach, Springfield, Mass., assignor to A. G. Spalding & Bros., New York, N. Y.

1,997,618. **Hose.** F. B. Williamson, Jr., Elizabeth, assignor to Whitehead Bros. Rubber Co., Trenton, both in N. J.

1,997,761. **Internally Coating Hollow Articles.** E. L. Bailey, Birmingham, and W. J. McCortney, Royal Oak, assignors to Chrysler Corp., Detroit, all in Mich.

Dominion of Canada

348,950 and 348,951. **Welt.** H. G. Halloran, Milton, Mass., U. S. A.

349,005. **Waterproof Textile Product.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of L. Kaunitz, Budapest, Hungary.

349,115. **Hose Nipple Connection.** Boston Woven Hose & Rubber Co., Cambridge, assignee of T. M. Knowland, Watertown, both in Mass., U. S. A.

349,137. **Latex Creaming.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of J. McGavack, Leonia, N. J., U. S. A.

349,316. **Rubber Article.** "Semperit" Oesterreichisch-Amerikanische Gummiwerke A. G., Vienna, assignee of E. A. Hauser, Wimpassing, both in Austria.

349,491. **Thermoplastic Rubber.** R. J. Reaney, assignee of T. R. Griffith, both of Ottawa, Ont.

United Kingdom

421,238. **Flooring.** Soc. Italiana Pirelli, Milan, Italy.

421,385. **Ornamented Rubber.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands.

421,771. **Color Photography.** C. L. Finlay, Watford.

421,902. **Ornamenting Rubber.** Redfern's Rubber Works, Ltd., and J. A. Redfern, both of Hyde.

422,099. **Pile Fabric.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of Magyar Ruggyantaarugyar Reszvenytarsasag, Budapest, Hungary.

422,157. **Molding Sponge Rubber.** Fabbriche Riunite Industria Gomma Torino, Turin, Italy.

422,171. **Spongy Composition.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands.

422,221. **Attaching Rubber to Surfaces.** W. Harrison, Midge Hall.

422,253. **Attaching Rubber to Articles.** O. Toczek, Cologne, Germany.

422,334. **Rubber Thread.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of Soc. Italiana Pirelli, Milan, Italy.
422,960. **Driving Belt.** Soc. Des Procedes Ecla (formerly Le Filastic), Paris, assignee of L. S. M. Lejeune, Paris, and E. J. A. Lejeune, Nord, all in France.

Germany

612,349. **Hollow Elastic Cushions.** K. Rathgeber, Kirchhausen b. Heilbronn a.N.
612,697. **Non-Slipping Rubber.** Azo A.G., Biel, Switzerland. Represented by W. Roederer, Berlin.
612,829. **Hollow and Hard Rubber Articles.** Kaysam Syndicate, Ltd., London, England. Represented by G. Lotterhos, Frankfurt a.M.
612,933. **Solid Tires.** Vorwerk & Sohn, Wuppertal-Barmen.

CHEMICAL

United States

19,526 (Reissue). **Coating Composition.** W. Koch, assignor to Hercules Powder Co., both of Wilmington, Del.
1,995,319. **Rubber Composition.** E. A. Murphy, Birmingham, F. T. Purkis, Moseley, and D. F. Twiss, Wylde Green, assignors to Dunlop Rubber Co., Ltd., Birmingham, all in England.
1,995,371. **Lubricant.** J. F. Werder, Lakewood, assignor of ½ to E. Rogers, So. Euclid, both in O.
1,995,623. **Impregnated Article.** G. A. Richter, assignor to Brown Co., both of Berlin, N. H.
1,995,747. **Reversible Rubber Composition.** R. J. Noble, Malden, assignor to Heveatex Corp., Melrose, both in Mass.
1,995,847. **Improving Rubber.** W. A. Gibbons, Montclair, N. J., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.
1,995,859. **Latex Composition.** W. E. Messer, Cheshire, Conn., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.
1,995,902. **Rubber Dyestuffs.** W. Scheurer and G. Niemann, both of Ludwigshafen a. Rhine, Germany, assignors to General Aniline Works, Inc., New York, N. Y.
1,996,001. **Rubber Solvent.** W. Seaman, Brooklyn, N. Y., and G. L. Matheson, Elizabeth, N. J., assignors to Standard Oil Development Co., a corporation of Del.
1,996,011. **Accelerator.** W. E. Messer, New Haven, Conn., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.
1,996,036. **Softener.** W. E. Tuley, Nutley, N. J., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.
1,996,090. **Coagulant Composition.** E. A. Willson, assignor to American Anode, Inc., both of Akron, O.
1,996,486. **Plastic Substance.** J. C. Patrick, assignor of ½ to N. M. Mnookin, both of Kansas City, Mo.
1,996,487. **Plastic Substance.** J. C. Patrick, Trenton, N. J.
1,996,593. **Accelerator.** E. Schwenk, Berlin-Westend, and H. Jordan, Glienicke, assignors to Schering-Kahlbaum A. G., Berlin, all in Germany.
1,996,937. **Chlorinated Rubber.** W. D. Spencer, Liverpool, England, assignor to Imperial Chemical Industries, Ltd., a corporation of Great Britain.
1,997,547. **Hard Rubber.** L. A. Edland, Glen Ridge, N. J., assignor to R. T. Vanderbilt Co., Inc., New York, N. Y.
1,997,760. **Accelerator.** I. Williams, Woodstown, N. J., assignor to E. I. du Pont de Nemours & Co., Wilmington, Del.
1,997,967. **Styrol.** W. A. Gibbons, Great Neck, and O. H. Smith, New York, assignors, by mesne assignments, to United States Rubber Co., New York, all in N. Y.
1,998,240. **Accelerator.** G. Källner, assignor to Silesia Verein Chemischer Fabriken, both of Ida- und Marienhutte, Germany.

Dominion of Canada

348,938. **Rubber Impregnating Solution.** R. Botson, Auderghem, Belgium.
349,010. **Tabbing Composition.** Lee Hardware Co., Salina, Kan., assignee of L. J. D. Healey, Milwaukee, Wis., both in the U. S. A.
349,157. **Rubber Surface Processing.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of R. H. Gerke, Packanack Lake, N. J., U. S. A.
349,429. **Artificial Leather.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of B. Holm, Clifton, N. J., U. S. A.
349,430. **Rubber Composition.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of S. D. Shinkle, Passaic, N. J., U. S. A.
349,450. **Latex Coated Paper.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of A. F. Owen, Beaver Falls, N. Y., U. S. A.

United Kingdom

421,113. **Bituminous Composition.** E. Rouault, Puy-de-Dome, France.
421,149. **Fibrous Composition.** F. Wolff, Berlin, Germany.
421,260. **Rubber Solution Vulcanization.** N. Lebedenko, M. Naphtali, N. Kroll, and H. Meyer, all of Berlin, Germany.
421,269. **Bituminous Emulsion.** E. Rouault, Puy-de-Dome, France.
421,313. **Chlorinated Rubber.** Chemische Fabrik Buckau, Saalkreis, Germany.
421,367. **Coloring Rubber.** E. L. Bower, Richmond.
421,435. **Synthetic Rubber Composition.** New York Belting & Packing Co., New York, N. Y., assignee of L. J. de Holczer, Bridgeport, Conn., both in the U. S. A.
421,499. **Cellulose Derivative Composition.** E. R. Campbell and Impermeable Products, Ltd., both of London.
421,533. **Accelerator.** Imperial Chemical Industries, Ltd., London, and W. Baird, Manchester.
421,810. **Accelerator.** Goodyear Tire & Rubber Co., Akron, O., U. S. A.
421,820. **Rubber Composition.** A. Davies, London.
421,942. **Adhesive.** C. Arnold, London. (I. F. Laucks, Inc., Seattle, Wash., U. S. A.)
422,027 and 422,028. **Artificial Leather.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of Soc. Anon. Prodotti Salpa & Affini, S. A. P. S. A., Milan, Italy.
422,047. **Rubber Composition.** T. and S. Arnold, both of Bradford.
422,130. **Condensation Product.** E. I. du Pont de Nemours & Co., Wilmington, Del., U. S. A.
422,136. **Accelerator.** Imperial Chemical Industries, Ltd., London, and W. Baird and J. S. H. Davies, both of Manchester.
422,148. **Waterproof Packing Material.** H. Hestnes, Oslo, Norway.
422,191. **Age Resister.** Goodyear Tire & Rubber Co., Akron, O., U. S. A.
422,303. **Porous Rubber Composition.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, and G. W. Trobridge, Birmingham.
422,308. **Antiscorch Material.** Rubber Service Laboratories Co., Akron, O., U. S. A.
422,320. **Cellulose Derivative Solution.** E. R. Campbell and Impermeable Products, Ltd., both of London.
422,354. **Accelerator.** W. J. Tennant, London. (Rubber Service Laboratories Co., Akron, O., U. S. A.)
422,419. **Rubber Composition.** C. R. De Berry, Woodford Green, and H. W. Taylor, Ilford.
422,670. **Coating Composition.** W. M. Munzinger, Heidelberg, Germany.
422,671. **Coloring Rubber.** R. Pickles, Burnley, and J. Pickles, Fence.
422,759. **Rubber Composition.** G. Borotto, Milan, Italy.
422,962. **Tacky Rubber.** F. J. Farrell, Beccles.

GENERAL

United States

19,520 (Reissue). **Bottle Closure and Dropper.** T. J. Dykema, Pittsburgh, Pa.
1,995,302. **Adjustable Heating Infusion Apparatus.** H. Goldstein, New York, N. Y.
1,995,350. **Closure.** P. O. Hoag, assignor to Whitehead & Hoag Co., both of Newark, N. J.
1,995,356. **Submarine Communication Conductor.** V. E. Legg, E. Orange, N. J., assignor to Bell Telephone Laboratories, Inc., New York, N. Y.
1,995,369. **Hair Waver.** H. H. Thiemen. San Francisco, Calif.
1,995,379. **Gasket.** L. H. Darbyshire, assignor to Norge Corp., both of Detroit, Mich.
1,995,442. **Artificial Foot.** R. Wolfe, Midvale, O.
1,995,531. **Bathing Suit.** L. H. Bachelis, assignor of 1/10 to J. Schecter, both of Los Angeles, Calif.
1,995,575. **Railway Vehicle Safety Device.** A. J. Michelin, Paris, assignor to Michelin & Cie., Clermont-Ferrand, both in France.
1,995,602. **Rectum Syringe.** T. Cho, Toyko, Japan.
1,995,733. **Applicator.** M. T. Brekke, Scarsdale, assignor to Northam Warren Corp., New York, both in N. Y.
1,995,734. **Elastic Fabric.** J. T. Callahan, Waban, assignor to Archer Rubber Co., Milford, both in Mass.
1,995,794 and 1,995,796. **Bicycle Wheel Mounting.** G. W. Clark, assignor to Westfield Mfg. Co., both of Westfield, Mass.
1,995,801. **Corset.** J. Field, Fairfield, assignor to Warner Bros. Co., Bridgeport, both in Conn.
1,995,844. **Horseshoe.** E. Eichenauer, Tonisheide, Germany.
1,995,975. **Heel Plate.** H. D. Fleschutz, Coudersport, Pa.

1,995,986. **Hat Structure.** A. Katz, assignor to Stylepark Hats, Inc., both of Philadelphia, Pa.
1,996,140. **Twin Tired Wheel Mounting.** P. M. Bourdon, Paris, assignor to Michelin & Cie., Clermont-Ferrand, both in France.
1,996,162. **Vehicle Coupling.** L. E. Lubbers, assignor to New Stoughton Co., both of Stoughton, Wis.
1,996,178. **Electric Air Pressure Indicator.** E. J. Thompson, Royal Oak, Mich.
1,996,210. **Joint.** H. C. and T. Lord, both of Erie, Pa.; T. Lord assignor to H. C. Lord.
1,996,242. **Catamenial Receptacle.** A. F. Hagedorn, Rocky River, O., assignor, by mesne assignments, to K. Woodburn, Indiana, Pa.
1,996,283. **Sand Mold Facing Material.** M. W. Dundore, assignor to Beloit Iron Works, both of Beloit, Wis.
1,996,285. **Tire Blow-out Patch.** C. D. Eckhart, Chicago, assignor to D. Hole, Winnetka, both in Ill.
1,996,348. **Printing Cylinder and Design Sheet.** L. T. A. Robinson, London, England.
1,996,377. **Rubber Glove Applier.** D. T. Hinchen, Sydney, N. S. W., Australia.
1,996,385. **Glass Clamp.** W. Owen, Pittsburgh, Pa., assignor to Pittsburgh Plate Glass Co., a corporation of Pa.
1,996,418. **Tire.** A. Hargraves, Silver Lake, assignor to Firestone Tire & Rubber Co., Akron, both in O.
1,996,479. **Chair Seat.** D. A. McCowan, Toronto, Ont., Canada.
1,996,529. **Belt Splice.** F. G. Skeyhan, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.
1,996,536. **Undergarment.** S. L. Berger, Newton Center, assignor to Boston Knitting Mills, Inc., Newton, both in Mass.
1,996,576. **Buoyant Bathing Implement.** E. C. Hegewaldt, Cleveland, O.
1,996,648. **Knitted Fabric.** R. H. Lawson, Pawtucket, and R. F. Lovell, Providence, assignors to Hemphill Co., Central Falls, all in R. I.
1,996,664. **Safety Pencil Holder.** C. Walker, Knoxville, Tenn.
1,996,703. **Beauty Mask.** R. Giuliano, So. Orange, N. J.
1,996,806. **Doll and Doll Parts.** A. Hajdu, Brooklyn, N. Y., assignor to Kelly-Springfield Tire Co., Cumberland, Md.
1,996,813. **Electric Scissors.** I. Jeppsson, assignor to Chicago Flexible Shaft Co., both of Chicago, Ill.
1,996,835. **Medical Pad.** W. M. Scholl, assignor to Scholl Mfg. Co., Inc., both of Chicago, Ill.
1,996,855. **Hose Pipe Nipple.** L. K. Cheswright, Swansea, Ont., Canada.
1,996,982. **Electrolytic Condenser.** R. C. Sprague and C. Shugg, assignors to Sprague Specialties Co., all of No. Adams, Mass.
1,997,115. **Toy Balloon Tire Wheel.** F. J. Merz, Jr., and C. B. Merry, both of Seattle, Wash.
1,997,185. **Electrolytic Condenser.** R. C. Sprague and J. F. McCann, assignors to Sprague Specialties Co., all of No. Adams, Mass.
1,997,187. **Football Headguard.** J. P. Taylor, Brooklyn, N. Y.
1,997,287. **Drawing Outfit.** F. Adler, Brooklyn, N. Y.
1,997,330. **Hat Form.** F. Elle, Chicago, Ill.
1,997,355. **Electrical Cable.** C. R. Boggs, Waban, assignor to Simplex Wire & Cable Co., Boston, both in Mass.
1,997,385. **Bag Filler Dustproof Seal.** G. Lodenkemper, Turners Falls, Mass., assignor to Andreas G. m. b. H., Munster, Germany.
1,997,389. **Insulating Material.** J. F. Palmer, St. Joseph, Mich.
1,997,391. **Storage Battery.** P. Pautou, Colombes, France.
1,997,403. **Wearing Apparel Supporter.** E. B. French, assignor to Union Specialty Co., both of Bridgeport, Conn.
1,997,442. **Bowed Expander Roll.** F. T. Walsh, assignor to Thomas Leyland Machinery Co., both of Boston, Mass.
1,997,488. **Driving Connection.** R. Henry, Rock Island, Ill.
1,997,731. **Tubing Head and Blow-out Preventer.** G. A. Humason, Houston, Tex.
1,997,738. **Steering Wheel Cover.** R. C. Maxedon, Seminole, Okla., and D. Penn, Perryton, Tex.
1,997,875. **Printing Plate Composite Matrix.** G. Rosenqvist, Oakmont, Pa.
1,997,899. **Electrically Heated Pad.** T. M. Dick, Des Moines, Iowa.
1,997,923. **Control Device.** M. W. Bowen, assignor to Hydraulic Brake Co., both of Detroit, Mich.
1,998,011. **Power Transmitting Belt.** L. H. Gladwin, Akron, O., assignor, by mesne assignments, to Wingfoot Corp., Wilmington, Del.
1,998,085. **Child's Garment.** R. W. Jones, assignor to Augusta Knitting Corp., both of Utica, N. Y.
1,998,099. **Surface Coating.** F. K. Shankweiler, Newport, assignor to Hercules Powder Co., Wilmington, both in Del.
1,998,140. **Garment.** A. M. Loew, Glen Cove, N. Y.
1,998,206. **Vibration Damper.** S. Rosenzweig, Long Island City, N. Y.
1,998,226. **Calisthenics Device.** P. E. Draheim, Milwaukee, Wis.
1,998,346. **Terrazzo.** W. A. Vogel, Toledo, O.
1,998,366. **Running Board Mat.** H. D. Geyer, Dayton, O., assignor, by mesne assignments, to General Motors Corp., Detroit, Mich.
1,998,415. **Vehicle Wheel.** R. Booth, assignor to Robert Booth & Co., both of Dover, N. J.

Dominion of Canada

348,956. **Horseshoe.** P. M. Kert, Montreal, P. Q.
348,972. **Coin Mat.** Sun Rubber Co., assignee of T. W. Smith, Jr., both of Barberton, O., U. S. A.
348,974. **Door Cushion and Catch.** J. L. Ventura, Park Ridge, Ill., U. S. A.
348,999. **Door Closer and Check.** Dictator Deursluiter Maatschappy, Amsterdam, Holland, assignee of C. Ischebeck, Voerde-Ennepe, Germany.
349,067. **Mattress Assembling Table.** A. J. Flynn, Toronto, Ont.
349,135. **Two-Stage Regulator.** Dominion Oxygen Co., Ltd., Toronto, Ont., assignee of R. J. Kehl, Bayside, and H. W. Jones, Williamsville, co-inventors, both in N. Y., U. S. A.
349,136. **Vibration Dampening Support.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of R. H. Gerke, Packanack Lake, N. J., U. S. A.
349,138. **Electrical Cable and Cord.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of G. B. Shaw and E. G. Sturdevant, both of Bristol, and C. W. Short, E. Providence, co-inventors, all in R. I., U. S. A.
349,163. **Elastic Fabric.** George C. Moore Co., assignee of T. F. Moore, both of Westerly, R. I., U. S. A.
349,214. **Step Board Tread.** H. G. W. Chichester-Miles, London, England.
349,230. **Pneumatic Tire.** A. Lacomblez, Brussels, Belgium.
349,249. **Conduit Connector.** L. E. Simpson, Cincinnati, O., U. S. A.
349,341. **Paper Making Machine.** M. O. Neilson, Ottawa, Ont.
349,357. **Garment Bust Supporter.** C. Gauthier, Montreal, P. Q.
349,360. **Surgical Belt.** C. M. Judd, Rochester, Minn., U. S. A.
349,370. **Dispatch Carrier.** J. T. Needham, No. Plainfield, N. J., U. S. A.
349,442. **Cushioning Body.** B. F. Goodrich Co., New York, N. Y., assignee of C. H. Heldenbrand, Akron, O., both in the U. S. A.
349,444. **Tank Roof Seal.** Hewitt Rubber Corp., assignee of J. M. Cranz, both of Buffalo, N. Y., U. S. A.
349,451. **Sheet Material.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of N. H. Brewster, Brooklyn, N. Y., U. S. A.

United Kingdom

420,201. **Vehicle Luggage Holder.** Soc. Anon. Des Usines Chausson, Asnières, France.
420,434. **Stuffing Box Substitute.** L. M. C. Seamark, Dawlish.
420,573. **Automobile Roof.** F. E. Jones, Herne Bay.
420,641. **Railway Vehicle Undercarriage.** Michelin & Cie., Clermont-Ferrand, France.
420,696. **Saddle.** H. and J. Jelley, both of Birmingham.
420,784. **Emergency Flotation Gear.** R. F. Dagnall, Guildford, and J. G. Lambert, Leicester.
420,894. **Draught Excluder.** M. E. Le Belec, Paris, France.
421,038. **Respiratory Mask.** G. Dolne-Dehan, Liege, Belgium.
421,080. **Refrigerator.** A. F. Burgess, London. (Norge Corp., Detroit, Mich., U. S. A.)
421,148. **Pneumatic Tire.** Soc. Italiana Pirelli, Milan, Italy.
421,176. **Chain-Link Mat.** Nuway Mfg. Co., Ltd., and R. V. C. Brook, both of Coalport, and J. F. Ramsey, Dundee, Scotland.
421,211. **Two-Part Coupling.** Bristol Aeroplane Co., Ltd., and A. H. R. Fedden, both of Bristol.
421,220. **Vehicle Wheel.** Dunlop Rubber Co., Ltd., London, and E. F. Goodyear and J. Wright, both of Coventry.
421,295. **Conveyer Belt Fastener.** W. L. Spence, Leamington.
421,370. **Tire.** G. Kielmansegg, near Vienna, Austria.
421,398. **Bottle.** A. Landrin, Paris, France.
421,406. **Cable.** Enfield Cable Works, Ltd., London, and F. W. Main, Enfield.
421,411. **Tea Withering Device.** G. N. Thomson, Exmouth.
421,445. **Golf Ball Core.** L. A. Young Co., Detroit, Mich., U. S. A., assignee of L. A. Young.
421,455. **Thermally Actuated Valve.** M. Payne, Surbiton, and British Thermostat Co., Ltd., Sunbury.

421,457. **Rotary Pump.** Gulf Research & Development Corp., Pittsburgh, Pa., U. S. A.
421,464. **Hot Water Bottle.** R. N. Mashal, Colwyn Bay.
421,470. **Cored Yarn.** G. F. McCahey, Providence, and W. C. Johnson, E. Providence, both in R. I., U. S. A.
421,473. **Boot Machine.** British United Shoe Machinery Co., Ltd., and F. Ricks, both of Leicester.
421,482. **Artificial Limb Ankle Joint.** C. Lander, Wellington, New Zealand.
421,524. **Atomizer.** Vaporisateurs M. Franck, Paris, France.
421,595. **Electrolytic Condenser.** Howell Electric Motors Co., Howell, Mich., U. S. A.
421,601. **Dark Room Lamp.** H. Flower, Ilford; J. Hazell, London; and Ilford, Ltd., Ilford.
421,604. **Paper Making Machine.** W. P. Evans, Swinton.
421,605. **Pen Stand.** B. A. Spaull, London.
421,617. **Spring Upholstery.** H. A. Lamplugh, Edgware.
421,628. **Electrolytic Condenser.** Howell Electric Motors Co., Howell, Mich., U. S. A.
421,629. **Flexible Tube Pump.** S. Percival, London. (M. C. Santiago, Johannesburg, South Africa.)
421,640. **Teeth Cleansing Appliance.** A. Rotter, Frankfurt a. M., Germany.
421,649. **Latex Container.** E. I. du Pont de Nemours & Co., Wilmington, Del., U. S. A.
421,654. **Bag Filler and Weigher.** K. Middelboe, Frederiksberg, Denmark.
421,664. **Vacuum Cleaner.** W. H. Clarkson, W. E. Gallehawk, and H. Weight, all of London.
421,682. **Sifter.** T. Robinson & Son, Ltd., W. N. Robinson, and T. J. Stevenson, all of Rochdale.
421,708. **Electric Heater.** C. V. McGuire, Detroit, Mich., U. S. A.
421,753. **Vehicle Spring Suspension.** W. Plumbridge, E. Howell, and J. W. C. Green, all of Camberley.
421,770. **Watch Case.** L. Cartier, Budapest, Hungary.
421,775. **Tire Pressure Gage.** A. Schrader's Son, Inc., Brooklyn, assignee of S. T. Williams, Bellerose, both in N. Y., U. S. A.
421,798. **Resilient Transmission Gear Wheel.** British Thomson-Houston Co., Ltd., London, assignee of Constructions Electriques de France, Paris, France.
421,835. **Floor Mat.** F. H. Petrie, Gravesend.
421,854. **Elastic Fabric.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of Magyar Ruggyantaarugyar Reszvenytarsasag, Budapest, Hungary.
421,909. **Automobile Windscreen.** J. H. Robertson, London.
421,912. **Abrading, Polishing Tool.** R. Bosch A. G., Stuttgart, Germany.
421,926. **Stencil.** T. M. Down, London, and W. Hill, Birmingham.
421,944. **Tube Cover.** H. Breddin, Kirchhain, Germany.
421,999. **Brush.** M. J. Fecher, London.
422,019. **Door Stop.** H. Hartemink and P. L. Prins, both of Amsterdam, and Naamlooze Vennootschap Plaatmetaalindustrie Van Mouwerik & Bal, Zeist, all in Holland.
422,021. **Web Feeder.** J. S. Wheelwright, Tonbridge; G. H. Abell, Esher; and R. F. Stewart, Tonbridge.
422,044. **Corset.** Dunlop Rubber Co., Ltd., London, and L. Brown and C. Hemm, both of Manchester.
422,109. **Hair Brush.** E. L. H. Cosby, London.
422,112. **Toy.** H. Bunzl, assignee of F. Spira, both of Vienna, Austria.
422,140. **Waterproof Bed Protector.** S. H. Rubin, Brookline, and J. J. Clifford, Reading, both in Mass., U. S. A.
422,177. **Cow Milker.** Aktiebolaget Manus, Norrköping, Sweden.
422,212. **Aircraft.** J. De La Cierva, Madrid, Spain.
422,225. **Chart.** E. Richardson, London.
422,226. **Compound Fibrous Sheet Material.** Raccolta A. G., Zurich, Switzerland, and H. Bunzl, Vienna, Austria.
422,229. **Milk Bottle Case.** J. Dessar, London.
422,258. **Clockwork Escapement.** Compagnie Industrielle De Mecanique Horlogere, Paris, France.
422,268. **Paper Crimper.** W. Fletcher and A. Fuchs, both of London.
422,319. **Heel Grip.** Stommel, Geb., assignee of A. Schneider, both of Barmen, Germany.
422,348. **Nursing Nipple.** K. H. Gray, Fareham.
422,418. **Friction Clutch.** Soc. Anon. A. Citroen, Paris, France.
422,425. **Hand Wheel.** Dunlop Rubber Co., Ltd., London, and E. F. Goodyear, J. Wright, and H. Trevaskis, all of Coventry.
422,443. **Friction Clutch.** F. B. Dehn, London. (Borg-Warner Corp., Chicago, Ill., U. S. A.)
422,519. **Waterproof Garment.** K. Stich, Rosenheim, Germany.
422,522. **Garment Supporter.** J. G. Tompkins, Los Angeles, Calif., U. S. A.
422,539. **Packing Case Binding.** A. G. Hillman, Ruislip.
422,550. **Electric Water Heater.** W. Glatez, Berlin, Germany.
422,575. **Driving Belt.** E. Cork, Bexley Heath.
422,584. **Optical Projection Apparatus.** H. C. Newton and Newton & Co., Ltd., both of London.
422,610. **Driving Belt.** R. J. Southwell and T. H. Wickwire, both of New York, N. Y., U. S. A.
422,717. **Convertible Bedstead Ambulance.** R. Y. K. N., D. K. L. N., and J. K. N. Evans, all of Wednesbury.
422,807. **Pipe Coupling.** E. Dubied & Cie. Soc. Anon., Neuchatel, Switzerland.

Germany

611,975. **Belt.** Roderwald Antrieb G.m.b.H., Berlin-Steglitz.
611,981. **Felly.** E. Feuerbach, Frankfurt a.M.
612,060. **Dress Shield.** Julius Friedlaender Gummiwaren-Fabrik G.m.b.H., Berlin.
612,304. **Tire Cover.** L. A. Herrmann, Koln-Ehrenfeld.
612,796. **Tire.** Gummiwerk Fulda A.G., Fulda.

TRADE MARKS

United States

322,957. **Thermoflex.** Antioxidant. E. I. du Pont de Nemours & Co., Wilmington, Del.
323,139. **Savafal.** Bathtub grips and floor mats. Rudolph, Healey & Scudder, Inc., New York, N. Y.
323,265. Representation of two fingers holding an eraser containing the words: **"A. W. Faber. Made in U. S. A. 7088 'Triad'."** Erasers, etc. A. W. Faber, Inc., Newark, N. J.
323,266. Representation of an eraser cap and the words: **"A. W. Faber Arrowhead."** Erasers, etc. A. W. Faber, Inc., Newark, N. J.
323,332. Representation of a streak of lightning and the words: **"Genuine Hard Rubber."** Battery boxes. Pacific Hard Rubber Co., Los Angeles, Calif.
323,370. **Pliolite.** Colored or uncolored resinous material for lacquers, paints, and other coating compositions. Goodyear Tire & Rubber Co., Akron, O.
323,391. **Sensation.** Cement for mending rubber articles. P. Katz, Ossining, N. Y.

Midwest

(*Continued from page 60*)

liam B. Stout, president, Stout Engineering Laboratories, and president of the Society of Automotive Engineers.

During the five days of the annual meeting the Society's Third Exhibit of Testing Apparatus and Related Equipment will be in progress. Latest developments in the testing and scientific instrument field will be on display, and A.S.T.M. committees and research laboratories will also take part.

European Notes

(*Continued from page 62*)

position. A number of local distributers have expressed the opinion that American tire sales in 1935 should increase about 40% over those of 1934.

From May 1 through June 30, 1935, a quota of 14,000 inner tubes for pneumatic tires for motor cars and 70,000 inner tubes for tires for bicycles and tricycles may be imported into the Irish Free State, according to a recent consular report.

U. S. Export Trade

United States exports of rubber products were valued at $5,723,139 in the first three months of 1935—an increase of 15, 63, and 21% over the corresponding period in 1934, 1933, and 1932, respectively.

Only one general class of rubber manufactures suffered a trade loss from the 1934 period, and this was slight: namely, rubber sundries and specialties, to $319,180 from $319,460. Gains were registered in all other classes of products, as follows: Tires, tubes, and tire repair materials, from $2,791,980 to $3,099,438, 11%; rubber footwear, soles and heels, from $160,761 to $217,188, 35%; mechanical rubber goods (belting, hose, packing, gaskets), $702,584 to $768,368, 9%; rubberized fabrics and hospital sheeting, $165,245 to $167,358, 1%; hard rubber goods, $71,807 to $86,264, 20%; semimanufactured rubber goods, including reclaimed rubber, scrap rubber, and rubber thread, $507,774 to $591,694, 17%; all other rubber products, $275,151 to $473,649, 72%. *Commerce Reports.*

ADVERTISING PAGES REMOVED

Market Reviews

CRUDE RUBBER

Commodity Exchange

TABULATED WEEK-END CLOSING PRICES

Futures	Mar. 30	Apr. 27	May 4	May 11	May 18	May 25
Apr.	11.09	.....	.....	.....	.....	.....
May	11.20	11.65	11.59	11.76	12.10	12.72
June	.....	11.70	11.61	11.81	12.14	12.76
July	11.35	11.78	11.66	11.87	12.18	12.81
Sept.	11.50	11.92	11.76	12.00	12.30	12.92
Dec.	11.72	12.12	12.03	12.23	12.50	13.15
Mar.	.....	12.30	12.26	12.46	12.74	13.39
Apr.	.....	.....	12.34	12.54	12.82	13.47
Volume for week (tons)	26,640	16,840	9,300	6,680	18,700	17,980

THE above table gives the nearest first and last week-end closing prices of the month previous to that under review, also the week-end closing prices of each week of this review. This plan permits tracing at a glance the trend of prices of representative futures for approximately two consecutive months.

Week ended April 27. A stronger position with an 8- to 13-point rise displayed itself as this period began, due entirely to the moderate covering and new buying ascribed to the disastrous Brooklyn warehouse fire the previous Saturday. About 1,800 tons were stored in the three warehouses affected. All of this was more or less damaged by water or soot, but less than half was reported to have been totally destroyed. The influence of labor uncertainties at the India Tire Co. plant, other commodity reactions, grains particularly, and failure of a large grain elevator operator more than offset advantageous sterling prices and favorable restriction news, to bring selling and downward price trends which resulted in the losses of 6 to 11 points for the week.

British Malaya production in March was reported to be 29,658 tons, against 30,109 in February, 38,327 in January, and 40,751 in March, 1934. This reduction was accounted for by the small, rather than the large estates.

Week ended May 4. This week started with a considerable activity, but little change in price as against the previous close. 5,120 tons were traded, 3,330 of which were the result of notice issuance. These were readily absorbed by brokers presumably buying for factory accounts. Strike developments in the automobile industry, increased shipments from producing sections in April, and easing values abroad were mid-week conditions that brought sagging interest as well as prices.

Following this activity, a 3¾¢ per ounce break in silver, lower sterling, and the tendency of the motor strike to spread started speculative selling that dropped prices 3 to 12 points, where it firmed because of factory demand to finish the week with little activity on the Exchange and losses of 4 to 16 points as against the previous week's close. It is predicted that tire production the first half of 1935 will not equal the last half of 1934. In anticipation of the 17½% price increase last year dealers and large users bought ahead sufficiently to impair replacement business this year. The United States received Malayan shipments totaling 24,499 tons in April, compared with 22,367 in March.

Week ended May 11. With foreign markets closed in celebration of the King's Jubilee local market activity was very limited, amounting to only 430 tons on the opening day and 460 on the second day; while prices fluctuated through the narrow range of but a few points. Activity resumed more normal proportions and prices an upward trend at the mid-week because of upturns in other commodities and securities. Sears, Roebuck & Co. advanced tire prices 6 to 7% in the Chicago area, and Montgomery Ward & Co. took the same action in many sections of the country. Firmness in foreign markets found reflection here as a broader interest revived in speculative covering and outside buying. Prices advanced 12 to 17 points on the closing day, which brought September to 12¢ and gave 19 to 22 points net gain for the week.

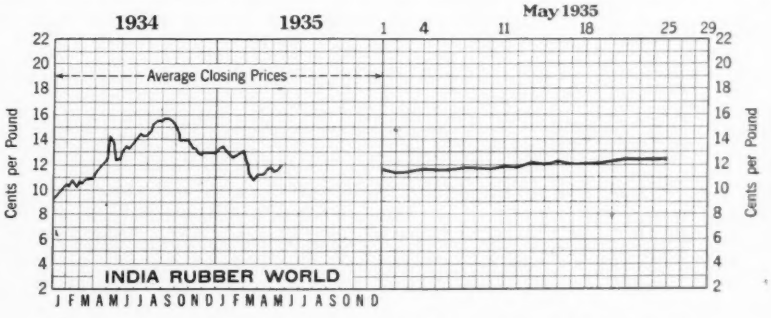
Malayan stocks awaiting shipment declined 6,085 tons in April. Dealers' stocks, according to Reuters, totaled 47,608 tons in April against 50,171 in March.

Week ended May 18. Reported settlement of the motor industry strike; the report that India Tire Co. would reopen; and the statement of Wm. O'Neil, president of the General Tire & Rubber Co., that the rising price of silver would reflect increases in the price of crude rubber and manufactured products caused broadened outside trading, increased speculative activity, firmer trends, and rising prices from the beginning of this period. Further decided buoyancy followed advice that the Dutch East Indies export taxes had been increased from 8 cents per half kilo to 9 cents, effective June 1; that native exports would be restricted to 35% from July to December because of failure to reduce quotas with other countries in the second quarter; and the significance of the policy of a large chemical company to urge its buying department to contract further ahead for raw materials.

Trading amounted to 5,570 tons May 14, with price gains of 27 to 29 points advancing all futures to well above the 12¢ level, May, for instance, 12.17. Substantial activity and further price advance resulted from inflation news, but the last two days brought a reversal of this trend which could be accounted for only by the uncertainty as to the outcome of the bonus legislation in Washington. The period closed with net gains of 27 to 34 points and with all futures above 12¢.

The trend of rubber producing countries to manufacture rubber products is of general interest. Preston W. Parker, of the Leather and Rubber Division of the Department of Commerce, indicated that Malaya, Netherland India, Ceylon, British India, Brazil, Philippine Islands, and Mexico are engaged in such interests.

Week ended May 25. Despite an unsettled condition of domestic and foreign commodities and lightness of actual demand the period began with a steady tendency, with slightly upward trending prices, 2 to 7 points above the previous close. Predictions that restriction would reduce world stocks



New York Outside Market—Spot Closing Prices Ribbed Smoked Sheets

100,000 tons this year, increased demand for actuals, an unusual optimism emanating from the convention of the National Association of Purchasing Agents seemed to stimulate speculation and the purchase of distant month contracts as a matter of investment, with a decided upward trend of prices resulting in a gain of 44 to 60 points by midweek. A drop in factory demand, the $28,000,000 failure of an Eastern banking and commercial house, and the report of increased Malayan production in April, 34,680 tons, compared with March, 29,658 tons, caused a few points' dip followed by another sharp upturn because of bullish developments in the industry, to close the period with net gains of 59 to 65 points, October at 13¢ and more distant futures proportionately higher with April, 13.47¢.

New York Outside Market

The last month of the first quarter of 1935 experienced a sharp break in crude rubber prices as it became evident that the 75% export restriction quota was not curtailing the production-consumption ratio as had been anticipated. The reduction of this quota to 70% for the second quarter stimulated an improvement of price as revealed by the following week-end closing prices for No. 1 smoked sheets: March 30, 11 5/16¢; April 27, 11 5/8; May 4, 11 1/2; May 11, 11 11/16; May 18, 12; and May 25, 12 1/16.

Week ended April 27. A fair factory demand for first and off-grade rubbers prevailed throughout the week, with slight easing the last two days. Prices fluctuated within a 1/16¢ range and closed with a 1/16¢ net loss at 11 5/8¢. Some nervousness still remained regarding the labor situation and became evident with reports that the India Tire plant would close because of inability to meet wage demands, and that labor difficulties had developed in a tire plant at Cumberland, Md., where a strike vote was to be taken.

Week ended May 4. Strike developments in the automobile industry and the increase of Malayan exports, 52,321 tons in April as compared with 47,407 in March, tended to restrict trade demand and ease prices. A sharp break of 3 3/4¢ per ounce for silver reflected itself in rubber, which dropped to 11 3/16¢, but steadied because of trade interest at that figure. The period closed at 11 1/2¢ for a net loss of 1/8¢.

Week ended May 11. Prices remained unchanged, and light factory demand continued during the first part of this period. This was followed by a revival of interest in shipment offerings and a 1/16¢ advance in price as other commodities took on a more favorable appearance here and London dealers became reluctant sellers. Local dealers held to 11 11/16¢ at which price the period closed with a 1/16¢ net gain. Akron operations consumed over 43,000 tons of rubber in April against 42,620 in March. Consumption for May is estimated to be 42,000 tons, with a drop in June to 40,242. Sears, Roebuck & Co. and Montgomery Ward & Co. advanced tire prices 6 to 7% in some districts in line with similar action taken by manufacturers some time ago.

Week ended May 18. Reported settlement of the labor difficulties in the automobile industry and the announcement that the India plant in Akron would reopen stimulated moderate interest in rubber trading as the period opened with standard ribs establishing a price of 11 15/16¢. The effect that higher silver prices would reflect to rubber, the advance of export duties on exports in Dutch East Indies, and the actual reopening of several motor plants increased trading activity as the period progressed until the standard sheet price reached 12 1/4¢. The week ended with a reactionary atmosphere due to profit taking in the commodity futures markets, closing at 12¢ with a net gain of 1/16¢. The R.M.A. reported 4,204,131 casings shipped and 4,345,581 produced during March which constituted, respectively, a 27.9% increase and a 1% decrease as compared with February, and 1/2% and 16.1%, respectively, under March, 1934.

Week ended May 25. Standard grades spot started this period 1/8¢ higher than the previous week closed although forward positions ruled at the same levels as before. Factory demand was very restricted, but Far East c.i.f. offerings were at prices higher than the local market. Factory demand became sufficiently active during the three following days to absorb all offerings at increasing prices. More than a 1/2¢ gain was experienced by midweek. This was followed by a reaction of 1/16¢ because of a restriction of factory demand, the reactionary disposition of the futures market. Stimulation came as the period closed, carrying prices to the highest point since the first of March: namely, 12 1/16¢, a net gain of 1/16¢ for the week.

New York Quotations

New York outside market rubber quotations in cents per pound

	May 25, 1934	Apr. 26, 1935	May 25, 1935
Plantations			
Rubber latex, normal .....gal.	60	50¾	53
Sheet			
Ribbed, smoked, spot	12 /12⅛	11¾/11 13/16	12 5/16/12 7/16
July-Sept.	12¼/12⅜	12 /12⅛	12 5/16/12¾
Oct.-Dec.	12⅜/12¾	12¾/12 15/16	12 13/16/13
Jan.-Mar.	12⅞/13⅛	....	13 1/16/13¼
Crepe			
No. 1 thin latex, spot	14 /14⅛	12 /12 7/16	12 11/16/12 13/16
July-Sept.	14¼/14⅜	12¼/12½	12⅞/13⅛
Oct.-Dec.	14⅝/14¾	12½/12 13/16	13 /13⅜
Jan.-Mar.	14⅞/15⅛	....	13 3/16/13 5/16
No. 3 Amber, spot	10 /10 1/16	10 5/16/10¾	11 5/16/11 13/16
No. 1 Brown	9⅞/10⅛	10¾/10 7/8	11 13/16/11¾
Brown rolled	8½/ 8¾	10 3/16/10½	10¾/11
Paras			
Upriver fine	11¾	9¼	9¾
Upriver fine	*13¾	*12¾	*12½
Upriver coarse	8	8	6½
Upriver coarse	*10½	*10	*11¼
Islands fine	10½	10½	10½
Islands fine	*13¼	*12½	*12¾
Acre, Bolivian fine	11½	9½	10
Acre, Bolivian fine	*14	*13	*12¾
Beni, Bolivian	11¾	9¾	10¼
Madeira fine	11¼	9¼	9¾
Caucho			
Upper ball	8	8	6½
Upper ball	*10½	*10	*11¼
Lower ball	7½	7½	6¼
Pontianak			
Bandjermasin	7	6	5
Pressed block	12	10	10/11
Sarawak	7	6	5
Manicobas			
Manicoba, 30% guar.	†6	..	..
Mangabiera, thin sheet	..	..	..
Guayule			
Duro, washed and dried	12	12	12
Ampar	13	13	13
Africans			
Rio Nuñez	10	12	12
Black Kassai	9¾	10	10
Prime Niger flake	16	25	25
Gutta Percha			
Gutta Siak	10	9¾	10¾
Gutta Soh	14½	14	14
Red Macassar	1.45	1.25	1.35
Balata			
Block, Ciudad Bolivar	50	32	32
Manaos block	50	30	27
Surinam sheets	52	35	35
Amber	55	37	38

*Washed and dried crepe. Shipments from Brazil. †Nominal.

Thickness Gaging and Controlling [1]

Gaging, recording, and automatically controlling the thickness of nonmagnetic material such as rubber, rubberized fabric, paper, etc., are ac-

[1] U. S. patent No. 1,989,038, Jan. 22, 1935.

New York Outside Market—Spot Closing Rubber Prices—Cents per Pound

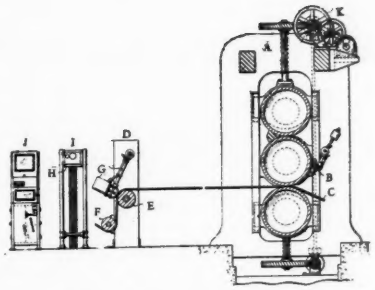
	April, 1935							May, 1935													
	22	23	24	25	26	27	29	30	1	2	3	4	6	7	8	9	10	11	13	14	15	16	17	18
No. 1 Ribbed Smoked Sheet	11 7/16	11 13/16	11 11/16	11 3/4	11 3/4	11 5/16	11 5/16	11 7/16	11 1/2	11 3/4	11 3/16	11 1/2	11 1/2	11 1/2	11 5/16	11 5/16	11 5/16	11 11/16	11 7/16	12 1/16	12 1/16	12 1/4	12 1/16	12
No. 2 Ribbed Smoked Sheet	11 1/2	11 7/16	11 7/16	11 3/4	11 3/8	11 3/4	11 3/4	11 3/4	11 7/16	11 7/16	11	11 3/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/4	11 7/16	11 5/16	11 1/2	11 13/16	11 3/4	11 7/16	11 13/16	11 5/16
No. 3 Ribbed Smoked Sheet	11 3/8	11 7/16	11 7/16	11 1/4	11 1/4	11 1/8	11 3/8	11 1/8	11 7/16	10 13/16	10 7/8	11	11	11	11 1/16	11 1/16	11 1/16	11 1/16	11 3/16	11 11/16	11 5/8	11 3/4	11 7/16	11 1/2
No. 4 Ribbed Smoked Sheet	11 1/4	11 7/16	11 7/16	11 1/8	11 1/8	11	11 1/16	11	10 13/16	10 7/8	10 13/16	10 13/16	10 13/16	10 13/16	11	11 1/16	11	11 1/8	11 1/16	11 5/16	11 1/16	11 11/16	11 1/2	11 7/16
No. 1 Thin Latex Crepe	12 1/4	12 3/8	12	12 3/8	12	11 7/8	11 7/8	11 13/16	11 3/4	11 5/8	11 3/4	11 3/4	11 3/4	11 3/4	11 13/16	11 7/8	11 13/16	11 13/16	12 1/8	12 1/2	12 7/16	12 1/2	12 5/8	12 1/4
No. 1 Thick Latex Crepe	12 1/16	12 3/8	11 7/8	11 13/16	11 7/8	11 3/4	11 3/4	11 13/16	11 5/8	11 1/2	11 5/8	11 5/8	11 5/8	11 5/8	11 11/16	11 3/4	11 11/16	11 11/16	12	12 3/8	12 1/16	12 3/8	12 5/16	12 1/8
No. 1 Brown Crepe	10 13/16	10 7/8	10 3/4	10 13/16	10 13/16	10 5/8	10 5/8	10 7/8	10 5/8	10 1/2	10 7/16	10 5/8	10 5/8	10 3/4	10 3/4	10 13/16	10 3/4	10 7/8	11 1/16	11 3/16	11 3/16	11 1/16	11 1/16	11 3/16
No. 2 Brown Crepe	10 13/16	10 3/4	10 5/8	10 13/16	10 7/8	10 1/2	10 5/8	10 7/8	10 1/2	10 3/8	10 7/16	10 1/2	10 1/2	10 5/8	10 5/8	10 13/16	10 1/2	10 5/8	10 13/16	11 1/4	11 1/4	11 1/16	11 1/16	11 1/4
No. 2 Amber	10 13/16	10 7/8	10 3/4	10 13/16	10 13/16	10 5/8	10 5/8	10 7/8	10 5/8	10 1/2	10 7/16	10 5/8	10 5/8	10 3/4	10 3/4	10 13/16	10 3/4	10 7/8	11 1/16	11 3/16	11 3/16	11 1/16	11 1/16	11 3/16
No. 3 Amber	10 13/16	10 3/4	10 5/8	10 13/16	10 7/8	10 1/2	10 1/2	10 7/8	10 1/2	10 3/8	10 7/16	10 1/2	10 1/2	10 5/8	10 5/8	10 13/16	10 1/2	10 5/8	10 13/16	11 1/4	11 1/4	11 1/16	11 1/16	11 1/4
No. 4 Amber	10 7/8	10 1/2	10 3/8	10 7/8	10 3/8	10 7/8	10 1/4	10 7/8	10 7/8	10 3/4	10 1/4	10 1/4	10 1/4	10 3/8	10 3/8	10 7/8	10 3/16	10 1/2	10 13/16	11	11	10 15/16	11	10 13/16
Rolled Brown	10 7/8	10 3/8	10 1/4	10 7/8	10 7/8	10 1/4	10 1/4	10 7/8	10 7/8	10 7/8	10	10	10	10	10 1/8	10 1/8	10 1/8	10 1/8	10 1/4	10 5/8	10 5/8	10 3/4	10 1/2	10 7/16

complished by special apparatus applied to a calender as indicated in the illustration.

The equipment is too intricate to admit here of detailed description. The chief objects of the invention, however, are to provide efficient means for maintaining substantially uniform thickness in continuous sheet material; quickly and automatically restoring it to proper gage after any variation; and to adjust the calender rolls when the sheet varies either way from a determinate thickness.

In the illustration *A* indicates a calender, adjacent to the middle roll of which a pivoted, counterweighted arm is located carrying a set of gaging rollers *B* bearing against a sheet of rubber being applied to the fabric *C*. A standard *D* supports the two rollers *E* and *F*.

Fabric *C*, after being coated, passes over roller *E* and under roller *F* to a wind-up. Its thickness is controlled by a device *G* resting against the sheet as it passes over roller *E*. A motor unit *H* of gaging device *G* is housed in support *I*. Cabinet *J* contains a second motor and associated mechanisms for operating



Thickness Gage and Controller

the group of gears that automatically adjust the rolls of calender *A* in order to sheet the rubber stock of uniform gage.

The invention thus provides fully automatic apparatus for gaging and recording the thickness of continuous sheet material and maintaining it at the desired gage.

British Malaya

An official cable from Singapore to the Malayan Information Agency, Malaya House, 57 Charing Cross, London, S.W.1, England, gives the following figures for April, 1935:

Rubber Exports: Ocean shipments from Singapore, Penang, Malacca, and Port Swettenham

	April, 1935	
To	Sheet and Crepe Rubber Tons	Latex, Concentrated Latex, Revertex, and Other Forms of Latex Tons
United Kingdom	12,081	290
United States	24,499	583
Continent of Europe...	7,203	121
British possessions	3,688	28
Japan	4,326	9
Other countries	524	8
Totals	52,321	1,039

Rubber Imports: Actual, by Land and Sea

	April, 1935	
From	Dry Rubber Tons	Wet Rubber Tons
Sumatra	2,840	4,355
Dutch Borneo	3,009	1,324
Java and other Dutch islands..	307	...
Sarawak	1,565	74
British Borneo	521	26
Burma	114	4
Siam	1,204	457
French Indo-China	50	63
Other countries	108	8
Totals	9,718	6,311

Eastern and Southern

(*Continued from page* 58)

Federal Specifications Board, Room 735, Federal Warehouse, Washington, D. C., has issued a proposed revision of FS. ZZ-H-466a, Federal Specification for Rubber-Metal Gasoline Hose, and is inviting comments or criticisms on the matter, which must be in the hands of the board by June 19. All interested are urged to communicate with the board as soon as possible.

RUBBER SCRAP

THE rubber scrap market for May was steady, and demand moderate.

BOOTS AND SHOES. These stocks were somewhat inactive, with demand falling off slightly.

INNER TUBES. The demand continues very good, and supplies ample.

TIRES. Prices are low, and in view of this fact collections are poor.

SOLID TIRES. Domestic demand is fair. Stocks are scanty. Export interest has recently increased slightly.

MECHANICALS. All grades are moving steadily, largely because of the requirements of the automobile industry for mats and various other rubber accessories other than tires and tubes.

HARD RUBBER. Hard rubber scrap is scarce, and prices remain firm and unchanged from a month ago.

Industrial and Engineering Chemistry, a publication of the American Chemical Society, has signed Charles R. Harte, Jr., a chemical engineer, as associate editor and assigned him to field duties. Mr. Harte had formerly been employed by the National Aniline & Chemical Co. and the U. S. Rubber Reclaiming Co.

George W. Jargstorff, formerly in charge of rubber and plastics research for C. K. Williams & Co., Easton, Pa., recently resigned his position with that company.

Krebs Pigment & Color Corp., 1007 Market St., Wilmington, at its new plant, modern in every detail and comprising twenty buildings, in Edge Moor, both in Del., which goes into operation about June 10, will manufacture three new pigments: Ti-Cal-Lo, Ti-Cal-Ho, and Ti-Cal-Bar. Krebs recently moved its main office from Newark, N. J., to Wilmington. The firm also operates plants in Newark, where dry colors and lithopone are made, in Baltimore, Md., where titanium dioxide is manufactured, and in Newport, Del., where lithopone is also produced.

CONSUMERS' BUYING PRICES

(Carload Lots Delivered Eastern Mills)

May 25, 1935

		Prices
Boots and Shoes		
Boots and shoes, black	*lb.*	$0.01 /$0.01⅛
Colored	*lb.*	.00¾/ .00⅞
Untrimmed arctics	*lb.*	.00¾/ .00⅞
Inner Tubes		
No. 1, floating	*lb.*	.07 / .07¼
No. 2, compound	*lb.*	.03¼/ .03⅜
Red	*lb.*	.02½/ .02⅝
Mixed tubes	*lb.*	.02⅝/ .02¾
Tires (Akron District)		
Pneumatic Standard		
Mixed auto tires with beads	*ton*	8.25 / 8.50
Beadless	*ton*	13.00 /13.50
Auto tire carcass	*ton*	9.50 /10.00
Black auto peelings	*ton*	18.00 /18.50
Solid		
Clean mixed truck	*ton*	36.00 /38.00
Light gravity	*ton*	42.00 /43.00
Mechanicals		
Mixed black scrap	*ton*	15.00 /17.00
Hose, air brake	*ton*	14.00 /15.00
Garden, rubber covered	*ton*	13.00 /13.50
Steam and water, soft	*ton*	13.00 /13.50
No. 1 red	*lb.*	.02¼/ .02⅜
No. 2 red	*lb.*	.01½/ .01¾
White druggists' sundries	*lb.*	.02¾/ .03
Mechanical	*lb.*	.02 / .02½
Hard Rubber		
No. 1 hard rubber	*lb.*	.11⅛/ .11½

New York Outside Market (Continued)

	May, 1935					
	20	21	22	23	24	25
No. 1 Ribbed Smoked Sheet	12 1/16	12 3/8	12 5/8	12 1/2	12 1/2	12 11/16
No. 2 Ribbed Smoked Sheet	11 3/4	11 13/16	12 1/16	12 1/8	12 1/8	12 1/16
No. 3 Ribbed Smoked Sheet	11 5/8	11 13/16	12 1/16	12	12	12 1/16
No. 4 Ribbed Smoked Sheet	11 1/2	11 3/4	12	11 13/16	11 7/8	11 15/16
No. 1 Thin Latex Crepe	12 3/8	12 7/16	12 5/8	12 11/16	12 3/4	12 13/16
No. 1 Thick Latex Crepe	12 1/4	12 5/16	12 1/2	12 9/16	12 5/8	12 11/16
No. 1 Brown Crepe	11 5/16	11 1/2	11 7/8	11 13/16	11 3/4	11 7/8
No. 2 Brown Crepe	11 1/4	11 3/8	11 3/4	11 11/16	11 5/8	11 3/4
No. 2 Amber	11 5/16	11 1/2	11 7/8	11 13/16	11 3/4	11 7/8
No. 3 Amber	11 1/4	11 3/8	11 3/4	11 11/16	11 5/8	11 3/4
No. 4 Amber	10 13/16	11 1/8	11 1/2	11 7/16	11 3/8	11 1/2
Rolled Brown	10 1/2	10 5/8	11	10 7/8	10 7/8	11

Low and High New York Spot Prices

All prices in cents per pound

	1935*	May 1934	1933
PLANTATIONS			
No. 1 thin latex crepe	11 5/16/12 1/16	14 /17⅛	5 7/16/6 7/16
No. 1 ribbed smoked sheet	11 3/8/12 1/16	12 /15¾	4 7/16/6 1/16
PARAS			
Upriver fine	9¼/ 9½	11 /13¾	6¼/8¼

*Figured to May 25, 1935.

IMPORTS, CONSUMPTION, AND STOCKS

CRUDE rubber consumption by United States manufacturers for April, 1935, totaled 44,714 long tons, compared with 42,620 long tons for March, 1935, an increase of 4.9% above March and practically no change as compared with April, 1934, according to R.M.A. statistics. Consumption for April, 1934, was 44,853 (revised) long tons.

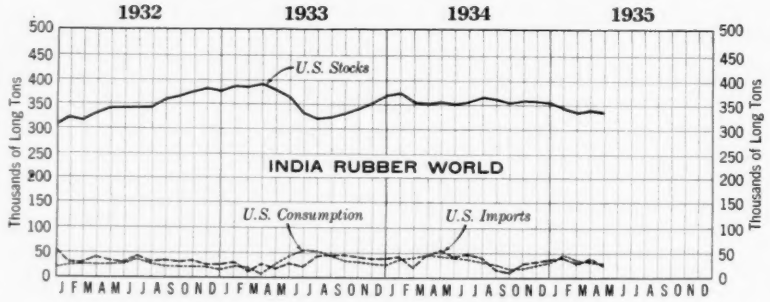
Crude rubber imports for April were 43,545 long tons, a decrease of 1.1% below the March figure of 44,041 long tons, and 4.6% under the 45,662 long tons imported in April, 1934.

The estimated total domestic stocks of crude rubber on hand April 30 were 334,954 long tons, against March 31 stocks of 338,700 long tons and 351,073 long tons on hand April 30, 1934.

Crude rubber afloat for the United States ports April 30 was 37,651 long tons, compared with 44,485 long tons afloat March 31 and 56,251 long tons afloat April 30, 1934.

London and Liverpool Stocks

Week Ended	Tons London	Tons Liverpool
Apr. 27	94,543	70,729
May 4	95,138	71,488
May 11	95,454	71,278
May 18	96,097	71,673
May 25	96,962	72,027


1932
1933
1934
1935
U.S. Stocks
INDIA RUBBER WORLD
U.S. Consumption
U.S. Imports
Thousands of Long Tons
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D

United States Stocks, Imports, and Consumption

United States and World Statistics of Rubber Imports, Exports, Consumption, and Stocks

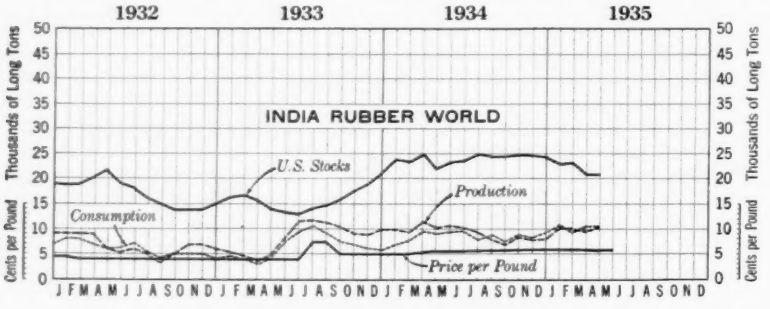
Twelve Months	U. S. Net Imports* Tons	U. S. Consumption Tons	U. S. Stocks Mfgrs., Importers, Dealers, Etc.† Tons	U. S. Stocks Afloat† Tons	U. K.— Public Warehouses, London, Liverpool†‡ Tons	Singapore and Penang Dealers and Port Stocks†‡ Tons	World Production (Net Exports)‡ Tons	World Consumption Estimated‡ Tons	World Stocks†‡§ Tons
1931	495,163	348,986	322,000	40,455	127,149	49,570	799,700	812,500	589,295
1932	400,787	332,000	379,000	38,360	92,674	30,927	708,800	709,600	589,153
1933	411,615	401,000	365,000	55,606	86,505	44,884	850,300	797,100	616,370
1934	469,484	453,223	355,000	47,644	134,927	62,142	1,015,398	954,556	678,994
1935									
January	42,059	47,103	346,084	42,066	148,337	59,609	79,701	88,966	671,954
February	35,383	43,187	337,332	42,969	155,727	57,586	75,701	90,244	658,717
March	44,041	42,620	338,700	44,485	162,012	55,100	66,508	.....	652,659
April	43,545	44,714	334,954	37,651	.....	.....	.....	.....	.....

*Including liquid latex. †Stocks on hand the last of the month or year. ‡Statistical Bulletin of the International Rubber Regulation Committee. §Stocks at U. S. A., U. K., Singapore and Penang, Para, Manaos and afloat.

RECLAIMED RUBBER

THE demand for reclaim is being well maintained. At present prices for crude, reclaim offers unusual manufacturing value. Quotations are uniformly steady, but the prospective tightening effect of crude rubber restriction will tend to advance rubber scrap and strengthen reclaim prices.

Prices on all grades of reclaim are quoted unchanged from last month.


1932
1933
1934
1935
INDIA RUBBER WORLD
U.S. Stocks
Production
Consumption
Price per Pound
Thousands of Long Tons
Cents per Pound
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D

Production, Consumption, Stocks, and Price of Tire Reclaim

United States Reclaimed Rubber Statistics—Long Tons

Year	Production	Consumption	Consumption Per Cent to Crude	United States Stocks*	Exports
1931	132,462	125,001	35.7	19,257	6,971
1932	75,656	77,500	23.3	21,714	3,536
1933	99,974	81,612	20.1	20,746	3,583
1934	110,010	100,597	22.3	23,079	4,737
1935					
January	10,465	11,261	23.9	22,291	517
February	10,072	9,374	21.7	22,989	532
March	9,741	10,549	24.8	20,637	310
April	10,315	10,466	23.4	20,521	....

*Stocks on hand the last of the month or year.
Compiled by The Rubber Manufacturers Association, Inc.

New York Quotations

May 25, 1935

	Spec. Grav.	Cents per lb.
High Tensile		
Super-reclaim, black	1.20	8¼/9
red	1.20	7 /7¼
Auto Tire		
Black	1.21	5 /5¼
Black selected tires	1.18	5¼/5½
Dark gray	1.35	6¼/6½
White	1.40	9¼/9½
Shoe		
Unwashed	1.60	6½/6¾
Washed	1.50	8 /9
Tube		
No. 1	1.00	13 /
No. 2	1.10	7½/7¾
Truck Tire		
Truck tire, heavy gravity	1.55	5½/6
Truck tire, light gravity	1.40	6 /6¼
Miscellaneous		
Mechanical blends	1.60	4¼/4½

Witco Stearite

Witco stearite is a synthetic stearic acid produced by the hydrogenation of low titre fish and vegetable oils. The physical and chemical characteristics are so nearly the same as those of stearic acid of tallow origin that direct substitution of the former gives identical results in rubber, paint, and grease industries.

COMPOUNDING INGREDIENTS

BUSINESS in compounding ingredients the past month has proceeded at a very moderate rate because of the retarding influence exerted by the demands on the part of labor organizations on the automotive industry. Production in other rubber manufacturing lines is consuming supplies at a slow but steadily advancing rate in conformity with the upward trend of industry in general. Several new ingredient specialties are announced this month.

ACCELERATORS. The list of accelerators is increased by the addition of three water soluble ultra-accelerators designated as numbers 85, 87, and 122. These are specialties for latex products, curing at low, high, and broad ranges of temperature.

ANTIOXIDANTS. Thermoflex and Thermoflex A are new antioxidants said to be exceptionally effective as protection against flex cracking of rubber goods.

CARBON BLACK. Producers of carbon black assure consumers that the Texas legislation for the conservation of natural gas in the Panhandle will not diminish the quality or the supply of carbon black. There is also reason to hope that the additional taxes proposed in the severance of natural gas will not unduly affect the carbon black situation. Carbon black stocks are now in a healthy position, and the industry seems to be in excellent balance.

LITHARGE. The last of April the price of litharge in less than carload lots was advanced ¼¢ per pound owing to the increase of metallic lead by $1 per ton.

LITHOPONE. Demand for lithopone is improving. Contract prices for the second half of the year are expected to remain unchanged.

RUBBER SOLVENTS. Prices remain steady. The demand slackened somewhat pending adjustment of the acute labor controversy in the Akron tire manufacturing plants. Active consuming demand to more normal proportions has since been resumed.

STABILIZERS. Choice of stabilizers of cure has been broadened by the introduction of two new items. These are Stearite, or stearic acid produced by hydrogenation of fish and vegetable oils, and Lauric-ol, synthetic stearic acid of petroleum origin.

ZINC OXIDE. The usual rate of consumer demand has been resumed after the lull due to labor readjustment in the tire division of the rubber industry. A group of three new titanium whites is announced under the following brand names: Ti-Cal-Lo, Ti-Cal-Ho, and Ti-Cal-Bar.

New York Quotations

May 25, 1935

Prices Not Reported Will Be Supplied on Application

Abrasives

Pumicestone, powdered	lb.	$0.01¼/$0.03½
Rottenstone, domestic	lb.	.02½/ .05
English	ton	
Silica, 15	ton	38.00
Tripoli	lb.	.02¼/ .03

Accelerators, Inorganic

Lime, hydrated	ton	20.00
Litharge (commercial)	lb.	.06
Magnesia, calcined, heavy	lb.	.04
carbonate	lb.	.06½

Accelerators, Organic

A-1	lb.	.21 / .25
A-5-10	lb.	.33 / .36
A-10	lb.	
A-11	lb.	.60 / .75
A-16	lb.	.55 / .65
A-19	lb.	.56 / .75
A-32	lb.	.70 / .80
A-77	lb.	
Accelerator 49	lb.	.40 / .52
85	lb.	
87	lb.	
122	lb.	
552	lb.	
808	lb.	
833	lb.	
Acrin	lb.	
Aldehyde ammonia	lb.	
Altax	lb.	
Beutene	lb.	
Butyl Zimate	lb.	
C-P-B	lb.	
Captax	lb.	
Crylene	lb.	
Paste	lb.	
D-B-A	lb.	
Di-Esterex	lb.	
Di-Esterex-N	lb.	
DOTG	lb.	.44 / .56
D.O.T.T.U.	lb.	
DPG	lb.	.35 / .47
Esterex	lb.	
Ethylideneaniline	lb.	
Formaldehyde P.A.C.	lb.	
Formaldehydeaniline	lb.	
Formaldehyde-para-toluidine	lb.	
Guantal	lb.	.42 / .51
Hepteen	lb.	
Base	lb.	
Hexamethylenetetramine	lb.	
Lead oleate, No. 999	lb.	.12
Witco	lb.	.15
Methylenedianilide	lb.	
Monex	lb.	
Novex	lb.	
Pipsolene	lb.	
R-2	lb.	1.50 / 1.90
Base	lb.	4.55 / 5.00
R & H 50-D	lb.	
Safex	lb.	
Super-sulphur No. 1	lb.	
No. 2	lb.	
Tepidone	lb.	
Tetrone A	lb.	
Thiocarbanilide	lb.	
Thionex	lb.	
Trimene	lb.	
Base	lb.	
Triphenyl guanidine (TPG)	lb.	
Tuads	lb.	
Ureka	lb.	$0.62 /$1.00
Blend B	lb.	
C	lb.	.58 / .69
Vulcanex	lb.	
Vulcanol	lb.	
Vulcone	lb.	
Z-B-X	lb.	
Z-88-P	lb.	.48 / .60
Zenite	lb.	
A	lb.	
B	lb.	
Zimate	lb.	

Acids

Acetic 28%	100 lbs.	2.65
glacial (carboys)	lb.	.14
Sulphuric, 66°	100 lbs.	11.60

Activator

Barak	lb.	

Age Resisters

Age-Rite Gel	lb.	
HP	lb.	
Powder	lb.	
Resin	lb.	
Syrup	lb.	
White	lb.	
Akroflex A	lb.	
B	lb.	
C	lb.	
Albasan	lb.	
Antox	lb	
A-V-A-R	lb.	
B-L-E	lb.	
Flectol B	lb.	
H	lb	
White	lb.	
M-U-F	lb.	
Neozone (standard)	lb.	
A	lb.	
C	lb.	
D	lb.	
E	lb.	
Oxynone	lb.	
Parazone	lb.	
Permalux	lb.	
Solux	lb.	
Thermoflex	lb.	
A	lb.	
V-G-B	lb.	

Alkalies

Caustic soda, flake, Columbia (400 lb. drums)	100 lbs.	$3.00 /$4.00
liquid, 50%	100 lbs.	2.25
solid (700 lb. drums)	100 lbs.	2.60 / 3.60

Antiscorch Materials

Antiscorch T	lb.	
Retarder B	lb.	
W	lb.	
R. H. Cumar	lb.	.085
U-T-B	lb.	

Antisun Materials

Heliozone	lb.	
Sunproof	lb.	

Binder, Fibrous

Asbestos	ton	30.00

Brake Lining Saturants

B. R. C. No. 553	lb.	.015 / .017
B. R. T. No. 3	lb.	.015 / .017

Colors

BLACK

Bone (Quality Group No. 1)	lb.	.11½/ .12
Lampblack (commercial)	lb.	.12

BLUE

Brilliant	lb.	
Prussian	lb.	.36½
Toners	lb.	.80 / 3.50
Ultramarine, dry, Group 1	lb.	.14

BROWN

Mapico	lb.	.13
Sienna, Italian, raw (Quality Group No. 1)	lb.	.12½

GREEN

Brilliant	lb.	
Chrome, light	lb.	.25
medium	lb.	.25
oxide	lb.	.18½/ .21½
Dark	lb.	
Guignet's	lb.	.70
Light	lb.	
Toners	lb.	.85 / 3.50

ORANGE

Lake	lb.	
Toners	lb.	.40 / 1.60

ORCHID

Toners	lb.	1.50 / 2.00

PINK

Toners	lb.	1.50 / 4.00

PURPLE

Permanent	lb.	
Toners	lb.	.60 / 2.00

RED

Antimony		
Crimson, 15/17%	lb.	.48 / .50
R. M. P. No. 3	lb.	.46
Sulphur free	lb.	.48 / .55

Golden 15/17%	lb.	$0.28	/$0.30
7-A	lb.	.33	
Z-2	lb.	.20	
Aristi	lb.	1.70	
Cadmium	lb.	.75 /	.80
Chinese	lb.		
Crimson	lb.		
Iron Oxides			
Rub-Er-Red	lb.	.09¼	
Mapico	lb.	.09¼	
Medium	lb.		
Scarlet	lb.		
Toners	lb.	.80 /	2.00
WHITE			
Lithopone (bags)	lb.	.04½/	.04¾
Albalith Black Label-11	lb.	.04½/	.04¾
Astrolith (5-ton lots)	lb.	.04½/	.04¾
Azolith	lb.	.04½/	.04¾
Cryptone-19	lb.	.06 /	.06¼
CB-21	lb.	.06 /	.06¼
Sunolith (5-ton lots)	lb.	.04½/	.04¾
XX-20 Zinc Sulphide	lb.	.10½/	.10¾
86	lb.	.10½/	.10¾
Rayox	lb.		
Titanolith (5-ton lots)	lb.	.06 /	.06¼
Titanox-A	lb.	.17 /	.18¾
B	lb.	.06 /	.06½
C	lb.	.06 /	.06½
Ti-Tone	lb.		
Zinc Oxide			
Anaconda, Green Seal			
No. 333	lb.	.09⅜/	.09⅝
Lead Free No. 352	lb.	.05¾/	.06
No. 570	lb.	.05¾/	.06
No. 577	lb.	.05¾/	.06
Red Seal No. 222	lb.	.08⅜/	.08⅝
U.S.P. No. 777 (bbls.)	lb.	.12¼	
White Seal No. 555	lb.	.10⅝	
Azo ZZZ-11	lb.	.05¾/	.06
44	lb.	.05¾/	.06
55	lb.	.05¾/	.06
66	lb.	.05¾/	.06
French Process, Florence			
White Seal-7 (bbls.)	lb.	.10⅝	
Green Seal-8	lb.	.09⅜/	.09⅝
Red Seal-9	lb.	.08⅜/	.08⅝
Kadox, Black Label-15	lb.	.09⅜/	.09⅝
Blue Label-16	lb.	.08⅜/	.08⅝
Red Label-17	lb.	.07 /	.07¼
Horse Head Special-3	lb.	.05¾/	.06
XX Red-4	lb.	.05¾/	.06
23	lb.	.05¾/	.06
72	lb.	.05¾/	.06
78	lb.	.05¾/	.06
80	lb.	.05¾/	.06
103	lb.	.05¾/	.06
110	lb.	.05¾/	.06
St. Joe (lead free)			
Black Label No. 20, c.l.	lb.	.05¾	
Green Label No. 42, c.l.	lb.	.05¾	
Red Label No. 30, c.l.	lb.	.05¾	
U.S.P. X (bbls.)	lb.	.12½	
YELLOW			
Cadmium	lb.	.40 /	.45
Lemon	lb.		
Mapico	lb.	.09½	
Ocher, domestic (Quality Group A)	lb.	.02¾	
Toners	lb.	2.50	

Dispersing Agents

Bardex	lb.	.023 /	.025
Bardol	lb.	.021 /	.023
Darvan	lb.		

Factice—See Rubber Substitutes

Fillers, Inert

Asbestine, c.l., f.o.b. mills	ton	15.00	
Barytes	ton	30.00	
f.o.b. St. Louis (50 lb. paper bags)	ton	22.85	
off color, domestic	ton	22.50	/25.00
white, imported	ton	32.50	/35.00
Blanc fixe, dry, precip	ton	70.00	/75.00
pulp	ton	42.50	/45.00
Calcene	ton	35.00	/43.00
Infusorial earth	ton	45.00	
Kalite No. 1	ton		
No. 3	ton		
Suprex, white, extra light	ton	45.40	/60.00
heavy	ton	45.40	/60.00
Whiting			
Chalk precipitated	lb.	.04¼/	.04¾
Columbia Filler	ton	9.00	/14.00
Domestic	100 lbs.		
Hakuenka	lb.		
Paris white, English cliff-stone	100 lbs.		
Southwark Brand, Commercial	100 lbs.		
All other grades	100 lbs.		
Sussex	ton		
Witco, c.l.	ton	7.00	
Wood flour (f.o.b. New Hampshire)	ton	23.00	/50.00

Fillers for Pliability

Flex	lb.		
Fumonex, c.l., f.o.b works, bags	lb.	.03	
l.c.l., f.o.b. warehouse	lb.	.05½/	.07
P-33	lb.		
Thermax	lb.		
Velvetex	lb.		

Finishes

IVCO lacquer, clear	gal.		
colors	gal.		
Rubber lacquer, clear	gal.		
colored	gal.		
Starch, corn, pwd.	100 lbs.	$3.68	/$3.88
potato	lb.	.04½/	.05¼
Talc, dusting	ton	20.00	/25.00
Pyrax	ton		

Flock

Cotton flock, dark	lb.	.10½/	.12
dyed	lb.	.50 /	.80
white	lb.	.14½/	.20
Rayon flock, colored	lb.	1.40 /	1.75
white	lb.	1.10	

Latex Compounding Ingredients

Antox, dispersed	lb.		
Aquarex D	lb.		
F	lb.		
Aresco	lb.	.28 /	.40
Aresklene	lb.		
Casein, domestic, ground, 20-30 mesh	lb.	.12	
Catalpo	ton		
Color pastes, dispersed	lb.		
Dispersaid	lb.	1.50	
Emo, brown	lb.	.13	
white	lb.	.13	
Factice Compound, dispersed	lb.	.36	
Heliozone, dispersed	lb.		
Igepon A	lb.		
Nekal BX (dry)	lb.		
Palmol	lb.	.10	
Sulphur, colloidal	lb.		
Vulcan colors	lb.		
Zinc oxide, colloidal	lb.		

Mineral Rubber

B. R. C. No. 20	lb.	.0125/	.014
Black Diamond, c.l.	ton	25.00	
Genasco Hydrocarbon, granulated, (fact'y)	ton		
solid	ton		
Gilsonite Hydrocarbon (factory)	ton		
Hydrocarbon, hard	ton		
soft	ton		
Parmr Grade 1	ton	25.00	/28.00
Grade 2	ton	25.00	/28.00
265°	ton		

Mold Lubricants

Mold Paste No. 1	lb.		
Rusco mold paste	lb.	.12 /	.30
Sericite	ton	65.00	/70.00
Soapbark	lb.	.12	
Soapstone	ton	25.00	

Oils

Castor, blown, c.l., drums, returnable	lb.	.11¾	

Reclaiming Oils

B. R. V.	lb.	.039 /	.041
S. R. O.	lb.	.012 /	.014

Reenforcers

Carbon Black			
Aerfloted Arrow Specification Black	lb.	.0535/	.0825
Arrow Compact Black	lb.		
Granulized Carbon Black	lb.		
Century (delivered)	lb.	.0535	
"Certified" Cabot	lb.		
Spheron	lb.		
Disperso (delivered)	lb.	.0535	
Dixie, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex.	lb.	.0445	
c.l., delivered New York	lb.	.0535	
local stock, delivered	lb.	.07 /	.08¼
Dixiedensed, c.l. f.o.b. New Orleans, La., Galveston or Houston, Tex.	lb.	.0445	
c.l., delivered New York	lb.	.0535	
local stock, delivered	lb.	.07 /	.08¼
Excello, c.l., f.o.b. Gulf ports	lb.	.0445	
delivered New York	lb.	.0535	
l.c.l., delivered New York	lb.	.07 /	.08¼
Gastex	lb.	.03 /	.07
Kosmobile, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex	lb.	.0445	
c.l., delivered New York	lb.	.0535	
local stock, delivered	lb.	.07 /	.08¼
Kosmos, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex	lb.	.0445	
c.l., delivered New York	lb.	.0535	
local stock, delivered	lb.	.07 /	.08¼
Micronex Beads	lb.		
Mark II	lb.		
Standard	lb.		
W-5	lb.		
W-6	lb.		
Ordinary (compressed or uncompressed)	lb.	.0535	
Supreme, c.l., f.o.b Gulf ports	lb.	.0445	
delivered New York	lb.	.0535	
l.c.l., delivered New York	lb.	$0.07	/$0.08¼
Carbonex	lb.	.030 /	.0375
Carbonex "S"	lb.	.0315/	.040
Clays			
Aerfloted Paragon	ton	8.50	
Suprex No. 1 Selected	ton	10.00	
No. 2 Standard	ton	8.50	
Blue Ridge, dark	ton		
China	ton		
Dixie	ton		
Junior	ton		
McNamee	ton		
Par	ton		
Perfection	ton		
Standard	ton		
Witco	ton	8.50	
Cumar EX	lb.	.04	

Reodorants

Amora A	lb.		
B	lb.		
C	lb.		
D	lb.		
Para-Dors	lb.		
Rodo No. 0	lb.		
No. 10	lb.		

Rubber Substitutes or Factice

Amberex	lb.	.13¾/	.23
Black	lb.	.07 /	.11
Brown	lb.	.07 /	.12
Duphax A	lb.	.095	
B	lb.	.095	
Fac-Cel B	lb.	.12	
C	lb.	.12	
White	lb.	.08 /	.12

Softeners

B. R. C. No. 555	lb.	.012 /	.014
B. R. T. No. 7	lb.	.015 /	.017
Burgundy pitch	lb.	.04 /	.05
(net weight)	lb.	.07 /	.08½
Corn oil, crude (bbls.)	lb.	.12	
Cycline oil	gal.	.15 /	.28
Palm oil (Witco)	lb.	.06	
Petrolatum, light amber	lb.	.03¾	
Pigmentar (drums)	gal.	.25 /	.27
Pigmentaroil (drums)	gal.	.25 /	.27
Pine oil, dest. distilled (drums)	gal.	.44 /	.48
pitch	bbl.	6.00	
tar (drums)	gal.	.25 /	.27
Plastogen	lb.		
Reogen	lb.		
Rosin oil, compounded	gal.	.50	
Rubtack	lb.	.07	
Tackol	lb.	.085 /	.18
Tonox	lb.		
Powder	lb.		
Witco No. 20	gal.	.09	

Softeners for Hard Rubber Compounding

RSL Resin	lb.		
Resin C Pitch 55° C. M.P.	lb.	.0125/	.0145
Resin C Pitch 70° C. M.P.	lb.	.0125/	.0145
Resin C Pitch 85° C. M.P.	lb.	.0125/	.0145

Solvents

Benzol 90% (drums)	gal.	.20	
Beta-Trichlorethane	gal.		
Bondogen	gal.		
Carbon bisulphide	lb.	.08½	
tetrachloride	lb.	.05¾	
Dipentene, commercial (drums)	gal.	.42 /	.44
Rubber (Group 3, refinery)	gal.	.06⅞	
Solvesso No. 1, tank cars	gal.	.17½	
No. 2	gal.	.22½	
No. 3	gal.	.17½	
No. 4	gal.	.22½	
Turpentine, wood, dest. distilled (drums)	gal.	.41 /	.43

Stabilizers for Cure

Laurex, ton lots	lb.		
Lauric-ol	lb.		
Stearex B	lb.	.11 /	.13
Beads	lb.	.09 /	.11
Stearic acid, dbl. pres'd	lb.	.12 /	.14
single pressed	lb.	.11 /	.13
Stearite	100 lbs.	9.80	
Zinc stearate	lb.	.22 /	.25

Synthetic Rubber

DuPrene Latex Type 50	gal.		
Type D	lb.		

Tackifier

B. R. H. No. 2	lb.	.015 /	.017

Varnish

Shoe	gal.	1.45	

Vulcanizing Ingredients

Sulphur			
Chloride, drums	lb.	.03½/	.04
Flowers, extrafine refined, U.S.P.	100 lbs.		
Rubber	100 lbs.	1.95 /	2.80
Telloy	lb.		
Vandex	lb.		

(See also Colors—Antimony)

Waxes

Carnauba, No. 3 chalky	lb.	.31	
2 N.C.	lb.	.33	
3 N.C.	lb.	.32	
1 Yellow	lb.	.40	
2	lb.	.39	
Montan, crude	lb.	.10¾	

COTTON FABRICS *for* THE RUBBER INDUSTRY

Wellington Sears Company for many years have worked with the leading rubber companies of this country in the development of suitable specifications for cotton fabrics and in supplying their requirements for such fabrics.

Among the many fabrics which our mills produce for the rubber industry may be mentioned:

HOSE DUCK
BELTING DUCK
CHAFER FABRICS
SHEETINGS
DRILLS

Our engineering staff and laboratories are available in the solution of any specific problem involving the use of cotton fabrics in the rubber industry.

Over any reasonable period of time it will be found that through the technical assistance of our organization and the ability of our mills to maintain uniform quality and meet contract and specification obligations you will save time, trouble and money.

One complimentary copy of our 538 page Hand Book of Industrial Fabrics is available to any responsible rubber manufacturer in the United States. Requests *must* be on company stationery from an executive.

WELLINGTON SEARS CO.

65 WORTH STREET · · · NEW YORK CITY

BOSTON • PHILADELPHIA • ATLANTA • DETROIT • CHICAGO • ST. LOUIS • NEW ORLEANS • SAN FRANCISCO

COTTON AND FABRICS

NEW YORK COTTON EXCHANGE WEEK-END CLOSING PRICES

Futures	Mar. 30	Apr. 27	May 4	May 11	May 18	May 25
Apr.	10.98	.....	.....	.....	.....	.....
May	11.03	11.85	11.88	11.94	11.99	.....
June	.....	11.86	11.89	11.94	12.01	11.97
July	11.10	11.88	11.90	11.94	12.04	11.98
Sept.	12.49	11.56	11.69	11.85	11.91	11.89
Dec.	12.54	11.46	11.65	11.86	11.89	11.90
Mar.	.....	11.57	11.76	11.96	11.97	11.95
Apr.	.....	.....	.....	.....	.....	11.97
May	.....	.....	.....	.....	.....	12.00

THE above table gives the nearest first and last week-end closing prices of the month previous to that under review, also the week-end closing prices of each week of this review. This plan permits tracing at a glance the prices of representative futures for approximately two consecutive months.

Week ended April 27. The Government holding 6,000,000 bales of old crop cotton at a price of 12¢ tends to limit the supply available to trading, caused light tenders against May contract, and advanced prices during this period to a net gain of 6 to 31 points, the higher increases being on the old crop months. Reports, denied from Washington and New Orleans, but confirmed from certain New England sources, indicated that pool cotton had been offered to New England mills on the condition that they buy an equal amount of futures, taking delivery on the contracts for replacement in the pool.

Week ended May 4. Easing silver prices, increasing fear that pool cotton might be loaned to mills for replacement with future contract deliveries, and the reluctance of traders to continue predictions as to what loan value, if any, the Government will place on the new crop cotton caused a dull, disinterested trading atmosphere that brought narrow price recessions during the first half of the week. New crop acreage estimates, by a cotton house, of 32,170,000 against the previous month's prediction of 33,770,000 confirmed the growing belief that farmers are keeping their acreage down for lack of loan assurances. This condition tended to increase the interest in futures during the latter part of the week, causing a net gain of 2 to 3 points in the near months and 16 to 19 points in the contracts of September and later. *The Journal of Commerce* quoted a local bureau stating that the Government pool consists of 1,300,000 bales of spots, 300,000 of long futures; while the loan holdings are 4,338,000, which is 338,000 bales more than the maximum predicted by Oscar Johnston, Government pool manager, early this year.

Week ended May 11. Favorable planting weather in the western part of Texas and Oklahoma influenced traders to ease their interests in futures, which action resulted in this period starting with recessions principally affecting new crop months. This condition gave way to an advancing trend during the remainder of the period to register net gains of 4 to 21 points. The decision of Mr. Johnston to release pool cotton to mills for immediate consumption with simultaneous purchase of futures contracts calling for replacement deliveries in the months May, July, and December, 1935, and January and March, 1936, was taken as an indication that the Government intended to put cotton futures back to a loan basis of 12¢ and at the same time relieve the possible shortage of old crop cotton for current mill needs. Lee Moor, a Texas cotton producer, appealed to the United States Supreme Court to review a decision of the Fifth Circuit Court of Appeals regarding the constitutionality of the Bankhead Act.

Week ended May 18. The Government was reported to be dealing heavily in futures switching operations during the week. Speculators stood by during the fore part of the period, but came in sparingly as it progressed and as Government activity tapered off. Expectation that the Patman bonus bill would pass with its inflationary conditions seemed to be the principal interest. Prices declined in the early period, but reacted with upward trend to reach new highs above the 12¢ level, for the movement. The period closed with a slight reaction, but with net gains of 1 to 10 points.

Week ended May 25. Trading activity throughout the period was measured by Government operations and was, therefore, very light until the closing day, as releasing pool cotton to mills and arranging for replacement with futures dwindled trading from an average daily volume of 20,000 bales during the previous week to approximately 5,000 each day of this week except Saturday when it returned to a 25,000-bale volume. Prices followed the trading activity. Beginning the week with a decline of 1 to 3 points closing prices fluctuated within a narrow range with a slightly downward trend until the last day, when it reacted to close the period 1 point higher to 6 points lower than the previous week's close. News developments of the week were conspicuously absent. Attention was centered on the bonus bill activity in Washington, but the non-inflationary outcome was of little or no market importance. *The Journal of Commerce* reported that this season's exports are 2,539,878 bales less than at the same time a year ago.

Cotton Fabrics

DUCKS, DRILLS, AND OSNABURGS. The market is slowly improving in the demand for fabrics. Prices are firmer than a month ago, in keeping with the stronger market for raw cotton. The status of the latter has marked recovery of virtually $10 a bale since the middle of March. Fabric prices are out of line with mill production costs. Improved price conditions in the fabric market are likely to broaden appreciably by late July.

RAINCOAT FABRICS. Interest in these goods is moderate and seasonal in conformity with the general trend of the fabric market.

(*Continued on page* 80)

WEEKLY AVERAGE PRICES OF MIDDLING COTTON

Week Ended	Cents per Pound
Apr. 27	11.99
May 4	12.21
May 11	12.28
May 18	12.37
May 25	12.39

New York Quotations

May 25, 1935

Drills	
38-inch 2.00-yard ..... *yd.*	$0.15¼
40-inch 3.47-yard	.09⅝
50-inch 1.52-yard	.22¼
52-inch 1.85-yard	.18¾
52-inch 1.90-yard	.15⅝
52-inch 2.20-yard	.14⅜
52-inch 2.50-yard	.12⅝
59-inch 1.85-yard	.16
Ducks	
38-inch 2.00-yard D. F. ..... *yd.*	.15 /.15½
40-inch 1.45-yard S. F.	.21⅛
51½-inch 1.35-yard D. F.	.21½
72-inch 1.05-yard D. F.	.28½/.29⅝
72-inch 17.21-ounce	.34½
MECHANICALS	
Hose and belting ..... *lb.*	.35
TENNIS	
52-inch 1.35-yard ..... *yd.*	.23½
***Hollands**	
GOLD SEAL	
30-inch No. 72 ..... *yd.*	.19
40-inch No. 72	.20
RED SEAL	
30-inch ..... *yd.*	.16½
40-inch	.17½
50-inch	.23
Osnaburgs	
40-inch 2.34-yard ..... *yd.*	.11¾/.13⅛
40-inch 2.48-yard	.11⅛
40-inch 2.56-yard	.10¾
40-inch 3.00-yard	.10¼
40-inch 7-ounce part waste	.11
40-inch 10-ounce part waste	.16¼
37-inch 2.42-yard	.12⅞
Raincoat Fabrics	
COTTON	
Bombazine 60 x 64 ..... *yd.*	.08¾
Plaids 60 x 48	.11½
Surface prints 60 x 64	.12½
Print cloth, 38½-inch, 60 x 64 ...	.06¼
SHEETINGS, 40-INCH	
48 x 48, 2.50-yard ..... *yd.*	.10⅝
64 x 68, 3.15-yard	.09⅜
56 x 60, 3.60-yard	.08⅜
44 x 48, 3.75-yard	.06¾
SHEETINGS, 36-INCH	
48 x 48, 5.00-yard ..... *yd.*	.05¾
44 x 40, 6.15-yard	.05
Tire Fabrics	
BUILDER	
17¼ ounce 60" 23/11 ply Karded peeler ..... *lb.*	.37¼
CHAFER	
14 ounce 60" 20/8 ply Karded peeler ..... *lb.*	.37¼
9¼ ounce 60" 10/2 ply Karded peeler ..... *lb.*	.37¼
CORD FABRICS	
23/5/3 Karded peeler, 1 1/16" cotton ..... *lb.*	.37¼
15/3/3 Karded peeler, 1 1/16" cotton ..... *lb.*	.35¼
23/5/3 Karded peeler, 1¼" cotton ..... *lb.*	.46¼
23/5/3 Combed Egyptian ..... *lb.*	.51¼
LENO BREAKER	
8¼ ounce and 10¼ ounce 60" Karded peeler ..... *lb.*	.32¼

*For less than 1,000 yards of a width add 10% to given prices.

The Wellman Company

Manufacturers of

THE PATTEN SOLE CUTTING MACHINE

FOR CUTTING SOLES AND TAPS FROM SHEET STOCK AT ANY BEVEL FROM 27° TO 90°.

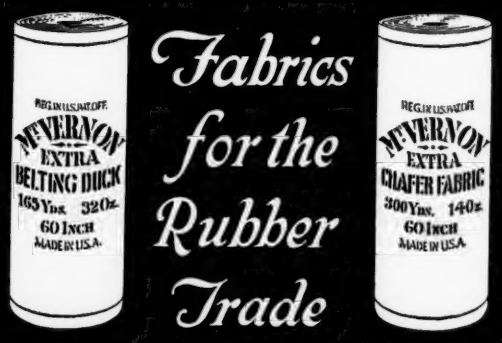
THESE MACHINES HAVE A CAPACITY MANY TIMES IN EXCESS OF HAND CUTTING. MANUFACTURED OF THE BEST MATERIALS AND WORKMANSHIP BUT LITTLE ATTENTION IS NECESSARY TO KEEP THEM IN SERVICEABLE CONDITION. THE SOLES CUT ARE OF SUCH STANDARD BEVEL AS MAY BE DESIRED AND POSSESS A SMOOTH AND ATTRACTIVE EDGE ADDING MUCH TO THE APPEARANCE OF THE FINISHED SHOE.

Wellman Company

Manufacturers of Rubber Sole Cutting Machinery

MEDFORD, MASS.

MT. VERNON WOODBERRY MILLS, INC.



TURNER, HALSEY CO.

SALES AGENT

40 WORTH ST., NEW YORK

BALTIMORE BOSTON — BRANCHES CHICAGO NEW ORLEANS — SAN FRANCISCO ST. LOUIS

Regular and Special Constructions of

COTTON FABRICS

Single Filling

Double Filling and

ARMY DUCKS

Hose and Belting

DUCKS

DRILLS

Selected

OSNABURGS

Curran & Barry

320 BROADWAY

NEW YORK

FINANCIAL

Goodyear Tire & Rubber

Consolidated net sales of The Goodyear Tire & Rubber Co., Akron, O., and its subsidiaries for the year ended December 31, 1934, were $136,800,764 as compared to $109,655,636 for 1933, an increase of 25%.

Consolidated earnings totaled $8,014,293 before interest charges, but after providing $8,252,400 for depreciation of plant buildings, machinery, and equipment, and $13,309,505 for taxes of all kinds in the United States and abroad, exclusive of customs duties amounting to $4,800,794, or an aggregate of all taxes of $18,110,299.

Net consolidated earnings for the year, after deduction for interest, discount, and premium charges and equities in earnings of subsidiary companies not wholly owned by the company, amounted to $4,553,964, which has been carried to the consolidated earned surplus.

Property Accounts: The net consolidated book valuation of the company's properties and plants all over the world now stands at $77,745,341. Depreciation reserves were generally maintained consistent with past practice and were substantially in excess of new capital expenditures.

Inventories of rubber and cotton, including commitments and the content of finished products, are carried on the basis of cost or market, whichever is lower. Since market prices are well in advance of our cost prices and inventory valuations are below current market levels, no inventory adjustments need be made.

Cash and government securities on hand amount to $31,978,507, government securities being carried on the basis of cost or market, whichever is lower. The company has no bank indebtedness, and its ratio of current assets to current liabilities is 11.7 to 1.

Net working capital amounted to $96,708,513, against $97,380,520 a year ago.

All sinking fund requirements have been met. The operation of the bond purchase fund resulted in retirement of $601,500 par value first mortgage and collateral trust bonds during the year.

$924,520 par value of subsidiary debt was retired, and $886,600 par amount of subsidiary preferred stocks were acquired, effecting a further reduction of charges prior to common stock.

Capital surplus account was increased through further acquisition of constituent company preferred stocks, at prices less than the par or stated value thereof and amounts similarly arising in prior years are now transferred to this account. On the other hand the account was charged with $5,277,053 to adjust an appreciation of properties resulting from an appraisal in 1920. Consequently the property accounts are now carried at actual cost, less depreciation.

To preserve Goodyear's position in the Far East there was commenced in 1934 the construction of a branch factory in Java, Netherland India, which is expected to be in operation soon.

The subsidiary, Goodyear-Zeppelin Corp., is constructing an articulated streamline train for the New York, New Haven & Hartford Railroad Co., as a standby use of its surplus facilities.

Other Company Reports

Mohawk Rubber Co., Akron, O., and subsidiaries. For 1934: net loss, $172,248, after taxes and interest, compared with a net loss of $181,142 in 1933.

Okonite Co., Passaic, N. J. For 1934: net loss after depreciation, interest, provision for income tax, and other deductions, $63,183, compared with $157,741 loss in 1933.

Samson Tire & Rubber Corp., Los Angeles, Calif., including United States Rubber Products Co. For 1934: net loss, $274,699, contrasted with a net profit of $52,466 in the preceding year.

United Shoe Machinery Corp., Boston, Mass. Net income after taxes for the year ended February 28, 1935, apart from $2,700,000 in dividends received from certain associated companies, amounted to $8,825,514.74, and after deduction of preferred dividends paid ($446,759.16) was equivalent to $3.65 per share of common stock based on the average number of shares outstanding during the year. In addition to the net income of $8,825,514.74, the corporation received from accumulated surpluses of certain associated companies, as stated above, $2,700,000 in dividends.

New Publications

(*Continued from page* 54)

The Vanderbilt News. R. T. Vanderbilt Co., 230 Park Ave., New York, N. Y. The May-June, 1935, issue of this publication contains much interesting data on a variety of compounding topics involving the use of new and old Vanderbilt materials in latex and dry rubber work. Formulae are detailed for red and black inner tubes for passenger car and bus service; also up-to-date suggestions are given for the use of Vanderbilt materials for various other rubber products.

"A Few New Adamson Developments." The Adamson Machine Co., Akron, O. As indicated by its title, this illustrated equipment bulletin is descriptive of the latest rubber working presses, extruding machines, etc., and supplements the company's standard equipment catalog No. 66.

"Lead Oleate 999 and Its Effect upon the Variability in Crude Rubbers." Buckleton & Co., Ltd., 13 Rumford St., Liverpool, England. The value of Lead Oleate 999 for correcting variability of cure encountered particularly in the lower grades of plantation and wild rubbers is treated at length in this pamphlet and is illustrated by charts showing the improvement of physical properties of roll brown rubber. Suggested formulae are given for tire stocks and the use of lead oleate in mechanicals, etc.

"Automobile Facts and Figures. 1934 Edition." National Automobile Chamber of Commerce, 366 Madison Ave., New York, N. Y. This annual compilation of data covers the pertinent facts of the automobile industry for 1933. It embodies many systematic tables of statistics and charts relating to the production and use of automobiles, their registration, taxation, etc. It is invaluable for reference, being authoritative and extensive in scope of data included.

"Annual General Report for 1931 on the Economic, Social, and General Conditions of the Island." The Ceylon Government Press, Colombo, Ceylon. 1932. This typical issue, 89 pages, paper covers, contains a map of the island and informative text compiled from the reports of the Government departments. The matter presented is thus thoroughly authenticated and is adequately indexed for convenient reference. Copies are obtainable at the Government Record Office, Colombo, at Rs. 2 each.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Boston Woven Hose & Rubber Co.	6% Pfd. (Am. Dep Rec.)	$3.00 s.a.	June 15	June 1
Dunlop Rubber Co., Ltd.	for Ord. Reg.	$0.29²/₃	May 28	Apr. 26
Faultless Rubber Co.	Com.	$0.50 q.	July 1	June 15
Firestone Tire & Rubber Co.	Pfd.	$1.50 q.	June 1	May 15
Gates Rubber Co.	Pfd.	$1.75 q.	June 1	May 16
Goodyear Tire & Rubber Co.	1st Pfd.	$1.00 q.	July 1	June 1
Goodyear Tire & Rubber Co. of Canada, Ltd.	7% Pfd.	$1.75 q.	July 1	June 15
Goodyear Tire & Rubber Co. of Canada, Ltd.	Com.	$1.25 q.	July 1	June 15
Hope Webbing Co.	Com.	$1.50 q.	May 1	Apr. 26
Raybestos-Manhattan, Inc.	Com.	$0.25 q.	June 15	May 31
Tyer Rubber Co.	6% Pfd.	$1.50 q.	May 15	May 8

Cotton and Fabrics

(*Continued from page* 78)

SHEETING. There is considerable hesitancy in taking forward commitments of grey goods with the unsettled questions of Government loan cotton, NRA extension, and processing tax. Stocks are still a burden on the market, and goods remain at prices wholly unattractive for any mill.

TIRE FABRICS. Demand is moderate and seasonal; while prices continue steady and unchanged.

CLASSIFIED ADVERTISEMENTS

ALL CLASSIFIED ADVERTISING MUST BE PAID IN ADVANCE

GENERAL RATES	SITUATIONS WANTED RATES	SITUATIONS OPEN RATES
Light face type $1.00 per line (ten words)	Light face type 40c per line (ten words)	Light face type 75c per line (ten words)
Bold face type $1.25 per line (eight words)	Bold face type 55c per line (eight words)	Bold face type $1.00 per line (eight words)

Allow nine words for keyed address. *Replies forwarded without charge.*

SITUATIONS WANTED

POSITION WANTED WITH AGGRESSIVE CONCERN MANUFACturing hard rubber or mechanical lines; as superintendent, or in development or selling capacity. Fully qualified by long experience in similar capacities with reputable companies. Diplomatic, energetic, capable. Chemist, designer, and practical executive. Address Box No. 510, care of INDIA RUBBER WORLD.

MAN, WITH 20 YEARS' EXPERIENCE IN CALENDER AND MILL room, also compounding. Capable of taking charge of calender room and mills. Can give excellent reference. Address Box No. 512, care of INDIA RUBBER WORLD.

EXPERIENCED COMPOUNDER AND CHEMIST. TEN YEARS' experience, chiefly mechanicals and dipped goods. Recent work with latex. Familiar with manufacturing processes. College graduate. Employed. Address Box No. 513, care of INDIA RUBBER WORLD.

FACTORY MANAGER OR SALES EXECUTIVE: THIRTY YEARS' experience packings, all types, asbestos, compressed sheet, flax, duck, rubber, metallic foils. Can equip and organize sales force for consumer and jobber trade. Know government, railroad, and trade requirements. Address Box No. 515, care of INDIA RUBBER WORLD.

SALES EXECUTIVE: MECHANICAL RUBBER GOODS. CAN qualify for any sales requirement. Twenty-five years' experience handling nation-wide business. Address Box No. 516, care of INDIA RUBBER WORLD.

SUPERINTENDENT, 15 YEARS' EXPERIENCE MANUFACTURING hard and soft mechanicals, 7 years manufacturing V-belts, now employed, desires change. Address Box No. 517, care of INDIA RUBBER WORLD.

POSITION WANTED BY YOUNG MAN WITH PRACTICAL EXperience and executive ability in mill and calender work. Address Box No. 519, care of INDIA RUBBER WORLD.

SITUATION WANTED: FOURTEEN YEARS' EXPERIENCE IN sale of mechanicals, molded goods with New York Belting and Packing Company. Territory, seven midwestern states, Metropolitan St. Louis. Age forty, references, wide acquaintance this territory. Address Box No. 521, care of INDIA RUBBER WORLD.

BUSINESS OPPORTUNITIES

WANTED: TO LEASE OR BUY SMALL RUBBER FACTORY IN good condition, with 60" 3-roll calender; 4 mills; and space 50' by 100'. Small community preferred. Address Box No. 509, care of INDIA RUBBER WORLD.

PROFESSIONAL SERVICES

ENGINEERS • CONSULTANTS • CHEMISTS

PAUL A. FRANK

RUBBER Products—Processes—Machinery

I finance and direct the development and promotion of inventions which relate to the rubber industry.

SECOND NATIONAL BLDG. **AKRON, O.**

BUSINESS OPPORTUNITIES—Continued

FOR SALE OR RENT: RUBBER PLANT. WILL EQUIP WITH machinery suitable for any line. Address Box No. 514, care of INDIA RUBBER WORLD.

WANTED: CONTRACT MOLDED WORK FOR SMALL PLANT OR would be interested in partner with mechanical specialty contacts with capital. Address Box No. 518, care of INDIA RUBBER WORLD.

RUBBER PLANT FOR SALE OR LEASE. COMMUNICATE WITH L. Albert & Son, Trenton, N. J.

LONDON RUBBER DEALING FIRM, SPECIALists for many years in Liquid Latex, wish to act as buying agents for American principals. Are closely in touch with all European producers.

Address

Box No. 508, care of INDIA RUBBER WORLD.

MISCELLANEOUS

Vacation Opportunity On South Jersey Shore

Large, attractive, comfortable room or suite in private home available to refined couple or family for all or part of summer season.

IDEAL BEACH

carefully restricted, guarded and safe. Meals conveniently available nearby.

Rate reasonable *References exchanged*

Address Box 520, INDIA RUBBER WORLD
420 Lexington Avenue New York

Headquarters for

RUBBER MILL MACHINERY

L. ALBERT & SON

Trenton, N. J. • Akron, Ohio

GUAYULE RUBBER

Washed and Dry, Ready for Compounding

PLANTATION RUBBER

From Our Own Estates in Sumatra

CONTINENTAL RUBBER COMPANY OF NEW YORK

745 Fifth Avenue New York

(*Advertisements continued on page 83*)

Tire Production Statistics

	Pneumatic Casings—All Types		
	Inventory	Production	Total Shipments
1932	6,115,487	32,067,732	32,200,820
1933	7,110,456	36,243,384	35,274,970
1934	9,171,335	45,815,763	45,285,955
1935			
Jan.	10,085,737	4,487,679	3,552,737
Feb.	11,183,674	4,251,183	3,188,772
Mar.	11,325,010	4,215,214	4,078,007
	Solid and Cushion Tires		
1932	23,830	97,089	108,581
1933	26,271	130,987	126,990
1934	34,710	197,497	187,152
1935			
Jan.	31,581	21,510	20,300
Feb.	.....	17,657	16,183
Mar.	.....	17,603	20,224
	Inner Tubes—All Types		
1932	5,399,551	29,513,246	30,328,536
1933	6,251,941	34,044,689	33,112,472
1934	8,904,496	44,840,971	43,694,130
1935			
Jan.	9,332,489	4,131,004	3,610,371
Feb.	10,151,721	4,046,062	3,261,488
Mar.	10,094,170	3,999,030	4,043,350

	Cotton and Rubber Consumption Casings, Tubes, Solid and Cushion Tires		Consumption of Motor Gasoline (100%) Gallons
	Cotton Fabric Pounds	Crude Rubber Pounds	
1932...	128,981,222	416,577,533	15,703,800,000
1933...	148,989,293	512,489,423	15,880,746,000
1934...	196,069,495	697,558,218	17,063,298,000
1935			
Jan....	19,607,932	72,968,356	1,178,604,000
Feb....	18,058,726	66,463,131	1,133,378,000
Mar....	17,581,651	64,583,859	1,343,874,000

Rubber Manufacturers Association, Inc., figures representing approximately 97% of the industry for 1934 and 1935 and 80% for previous years, with the exception of gasoline consumption.

U. S. Highway Summary

(1933 Calendar Year)

Total mileage in United States...	3,040,000
State highway system. 360,000	
County and local roads 2,680,000	
Mileage surfaced, rural roads....	920,000
State highways 300,000	
Local roads 620,000	
High type surface	160,000
Mileage surfaced during 1933 (Reconstructed surfacing included)	52,000
Income, rural roads (estimated)..	$1,400,000,000
Expenditures, rural roads (estimated)	$1,300,000,000
Street construction and maintenance	$ 350,000,000
State and federal highway employment, direct and indirect (May, 1934)	1,220,000
R. F. D. mail route mileage.....	1,359,840

United States Latex Imports

Year	Pounds	Value
1931	10,414,712	$884,355
1932	11,388,156	601,999
1933	24,829,861	1,833,671
1934	**29,276,134**	**3,633,253**
1935		
Jan.	1,898,962	287,583
Feb.	**1,282,941**	**179,583**
Mar.	2,889,525	354,654

Data from Leather and Rubber Division, United States Department of Commerce, Washington, D. C.

Rubber Trade Inquiries

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

No.	Inquiry
1733	Manufacturer of rubber weight that clamps on telephone cords to keep them from curling.
1734	Manufacturer of machine for beading balloon edges.
1735	Manufacturer of yardage proofed material of thin oil-silk-like character or thin rubberized silk.
1736	Manufacturer of automatic, flexible rubber nozzle.
1737	Manufacturer of perforated rubber mats.
1738	Manufacturer of sponge rubber mats.
1739	Manufacturer of reclaimed rubber driers.
1740	Manufacturer of Rubhide or similar preparations of rubber and glue.
1741	Manufacturer of machine to wind Kapok cores for soft balls.
1742	Manufacturer of lacrosse balls.
1743	Manufacturer of detreading machines.
1744	Manufacturer of pink toners.
1745	Manufacturer of retreading apparatus.
1746	Manufacturer of rubber stamp rubber.
1747	Manufacturer of machinery used in making rubber cement.
1748	Manufacturer of rubber bands.
1749	Supplier of pure gutta percha and pure caoutchouc.
1750	Manufacturer of Lastex thread.

U. S. Crude and Waste Rubber Imports for 1935

	Plantations	Latex	Paras	Africans	Centrals	Guayule	Manicoba and Matto Grosso	Totals 1935	Totals 1934	Balata	Miscellaneous	Waste
Jan. .....*tons*	41,188	599	201	30	41	..	..	42,059	46,204	26	553	..
Feb.	**33,722**	**388**	**1,208**	14	51	..	..	35,383	31,032	73	194	29
Mar.	42,373	967	513	167	21	..	..	44,041	44,605	55	659	40
Apr.	41,857	1,089	531	63	5	..	..	43,545	45,662	60	644	14
Total, 4 mos., 1935 .....*tons*	159,140	3,043	2,453	274	118	..	..	165,028	.....	214	2,050	83
Total, 4 mos., 1934 .....*tons*	162,750	3,451	1,074	61	17	150	..	.....	167,503	477	2,348	288

Compiled from The Rubber Manufacturers Association, Inc., statistics.

World Net Imports of Crude Rubber

Year	U.S.A.	U.K.	Australia	Belgium	Canada	Central Europe	France	Germany	Italy	Japan	Russia	Rest of the World	Total
1926	399,900	84,900	9,000	2,500	20,200	5,100	35,700	22,800	9,800	18,300	7,000	8,000	623,200
1927	403,400	59,800	9,500	6,500	26,400	8,200	35,700	38,900	11,300	20,500	14,000	7,900	642,100
1928	407,500	4,400	8,400	7,900	30,900	10,000	38,000	37,900	12,400	25,800	8,000	12,000	603,200
1929	528,600	122,800	15,900	9,400	35,500	13,900	61,800	49,100	16,400	34,300	12,700	16,400	916,800
1930	457,400	120,000	5,400	10,700	28,800	12,100	71,400	45,800	18,600	33,000	16,700	18,700	838,600
1931	476,200	85,200	7,700	11,000	25,300	15,200	47,800	39,200	10,100	43,500	30,700	20,600	812,500
1932	393,800	43,500	12,400	9,500	20,900	15,800	41,700	45,000	15,300	56,100	30,000	25,600	709,600
1933	398,400	73,300	13,500	11,200	19,300	18,900	63,100	54,100	19,300	66,900	30,800	28,300	797,100
1934	438,941	158,481	9,642	9,116	28,439	23,427	50,405	59,330	21,403	69,934	47,272	38,166	954,556
1935													
Jan.	39,546	20,383	1,099	419	2,670	2,116	5,678	4,286	1,648	4,402	3,446	3,273	88,966
Feb.	45,999	15,609	848	399	1,558	2,697	4,670	3,513	4,356	5,585	1,810	3,200*	90,244
Mar.	.....	12,810	....	.....	.....	.....	.....	6,353	.....	.....	.....	.....	.....

* Estimate. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

Shipments of Crude Rubber from Producing Countries

Year	Malaya Including Brunei and Labuan	N.E.I.	Ceylon	India	Burma	North Borneo	Sarawak	Siam	French Indo-China	Philippines and Oceania Total	Oceania	Africa	South America	Mexican Guayule	Grand Total
1926	286,000	204,000	58,800	6,500	4,500	5,800	9,900	3,500	8,100	587,100	1,000	9,500	26,700	4,000	628,300
1927	242,000	229,000	55,400	7,000	5,800	6,600	11,200	4,700	8,900	570,600	1,300	8,500	30,800	5,000	616,200
1928	299,000	229,000	58,000	7,200	4,800	7,000	10,600	4,100	9,100	628,800	1,300	7,500	21,600	3,000	662,200
1929	457,000	255,000	80,300	7,900	5,500	7,400	11,200	4,300	9,500	838,100	900	6,300	21,300	1,300	867,900
1930	443,000	241,000	75,600	6,800	5,200	7,100	10,600	4,700	9,700	803,700	1,200	4,900	14,300	1,000	825,100
1931	423,000	257,000	62,300	5,400	4,200	6,200	10,400	3,600	11,000	783,100	900	3,500	12,200	0	799,700
1932	406,000	211,000	49,300	1,100	3,000	5,400	7,100	3,000	13,500	699,400	800	2,100	6,500	0	708,800
1933	445,800	280,800	63,800	1,500	3,400	7,800	11,100	7,000	15,900	837,100	1,100*	2,000	10,100	0	850,300
1934	467,030	378,017	79,068	5,735	5,719	11,086	17,708	17,714	19,626	1,001,703	1,233*	2,921	9,143	398	1,015,398
1935															
Jan.	41,665	18,574	6,294	1,549	945	1,238	1,574	2,614	2,575	77,028	105	460	2,108	0	79,701
Feb.	32,824	27,807	5,551	331	489	760	1,922	2,288	2,018	73,990	100	254	1,357	0	75,701
Mar.	34,059	22,312	1,720	257	471	773	1,901	2,076	1,440	65,009	100	500*	899	0	66,508

*Estimate. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

ERNEST JACOBY & CO.

Crude Rubber
Liquid Latex
Carbon Black
Clay

Stocks of above carried at all times

BOSTON MASS.

Cable Address: Jacobite Boston

OHIO KNOCK-DOWN STEEL REEL

for TUBING *and* STRIPPING
STRONG *and* SECURE
SAVES STORAGE SPACE
EASILY ASSEMBLED

Made from 22, 24 or 26 gauge steel sheets with heads in diameters of 9, 11 and 14 inches. Standard reels made 24 gauge with 14 inch heads, with core 4 inches in diameter and either 15 or 20 inches long. Minimum shipments 72 reels packed in cartons.

OHIO PAIL COMPANY
MIDDLEFIELD, OHIO

Classified Advertisements

Continued

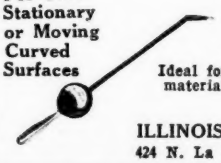
MACHINERY AND SUPPLIES FOR SALE

FOR SALE: ONE ROYLE NO. 4 PERFECTION TUBER; THREE Birmingham 72″ Mixing Mills; four 82″ Mixing Mills; one 2-roll Calender 14 by 14″ belted to motor; one 18 by 54″ Birmingham 4-roll Calender; one unused 18 by 30″ heavy duty FARREL MILL, chain drive; complete line of W. & P. Mixers, Vacuum Shelf Driers, Calenders, Mills, Colloid Mills, Pebble Mills, Dough Mixers, Hydraulic Presses, Pumps, etc. Rebuilt, guaranteed. What machinery have you for sale? CONSOLIDATED PRODUCTS CO., INC., 13-16 Park Row, New York N. Y.

FOR SALE: 2 ROYLE NO. 4 STRAINERS; 1 ADAMSON 42″ BY 120″ hydraulic press; 2 American Process automatic continuous screw presses; vacuum shelf driers; W & P mixers, etc. ATTRACTIVELY PRICED! Send us a list of your surplus equipment. STEIN-BRILL CORPORATION, 183 Varick Street, New York, N. Y.

MAKERS OF METAL VULCANIZING MOLDS FOR SPECIALTIES, also white metal casting molds, etc. Baum's Metal Specialties, 1523 Wyandotte, Kansas City, Mo.

For Flat Stationary or Moving Curved Surfaces



Surface Temperatures
Use the "Alnor" Pyrocon

Ideal for rolls, molds, plates, platens and plastic material temperatures.

Write for bulletin.

ILLINOIS TESTING LABORATORIES, Inc.
424 N. La Salle Street Chicago, Illinois

HYDRAULIC VALVES

Operating, Globe, Angle, or Check Valves—Hydraulic Presses, Accumulators, Pumps, etc. —For almost any size or pressure.

Dunning & Boschert Press Co., Inc.
336 W. WATER ST. SYRACUSE, N. Y.

INTERNATIONAL PULP CO.
41 Park Row, NEW YORK, N. Y.
SOLE PRODUCERS
ASBESTINE
REG. U. S. PAT. OFF.

MECHANICAL MOLDED RUBBER GOODS
We Solicit Your Inquiries
THE BARR RUBBER PRODUCTS COMPANY
SANDUSKY, OHIO

WOOD FLOUR

AN EXCELLENT FILLER
—
UNIFORM SCREEN ANALYSIS

BECKER, MOORE & CO., INC.
NORTH TONAWANDA, N. Y.

GUARANTEED REBUILT MACHINERY

IMMEDIATE DELIVERIES FROM STOCK

UNITED

MILLS, CALENDERS, TUBERS, HYDRAULIC PRESSES, PUMPS, VULCANIZERS, TIRE MAKING EQUIPMENT, MOULDS, ETC.

UNITED RUBBER MACHINERY EXCHANGE
319-323 FRELINGHUYSEN AVE., Cable Address "Urme" NEWARK, N. J.

A. Schulman Inc.

SCRAP RUBBER
CRUDE RUBBER
HARD RUBBER DUST

MAIN OFFICE
608 AKRON SAVINGS & LOAN BLDG, AKRON, OHIO - - BRANCH OFFICE 576 N. 20th St. EAST ST. LOUIS, ILL.

(*Advertisements continued on page* 85)

United States Statistics

Imports for Consumption of Crude and Manufactured Rubber

	February, 1935		Two Months Ended February, 1935	
UNMANUFACTURED—*Free*	Pounds	Value	Pounds	Value
Crude rubber	105,887,929	$12,291,242	194,760,957	$23,143,550
Liquid latex	1,282,941	179,583	3,181,903	467,166
Jelutong or pontianak	498,043	33,850	1,500,537	113,947
Balata	139,809	20,981	320,334	55,848
Gutta percha	12,863	5,805	845,067	122,943
Scrap and reclaimed, etc.	352,592	1,800	707,465	6,948
Totals	108,174,177	$12,533,261	201,316,263	$23,910,402
Chicle, crude—*Free*	739,337	$189,166	2,222,512	$517,615
MANUFACTURED—*Dutiable*				
Rubber soled footwear with fabric uppers—*pairs*	58,279	$7,849	138,049	$49,989
Rubber toys	66,468	6,948	240,959	30,390
Druggists' sundries, n. e. s.	.....	3,964	.....	14,265
Combs, hard rubber—*number*	55,884	2,978	96,636	5,537
Golf balls—*number*	14,688	2,513	28,008	4,986
Tennis and other rubber balls—*number*	471,541	16,965	1,016,969	23,953
Tires—*number*	1,394	3,688	2,276	4,629
Other rubber manufactures	.....	26,150	.....	53,600
Totals	.....	$71,055	.....	$187,349

Exports of Foreign Merchandise

RUBBER AND MANUFACTURES				
Crude rubber	4,133,750	$480,440	6,321,974	$758,669
Balata	25,190	5,457	50,168	12,052
Gutta percha, rubber substitutes, and scrap	15,200	2,000	15,200	2,000
Rubber manufactures	.....	2,891	.....	7,229
Totals	.....	$490,788	.....	$779,950

Exports of Domestic Merchandise

RUBBER AND MANUFACTURES				
Reclaimed	1,190,980	$60,604	2,348,822	$116,183
Scrap	3,262,051	74,273	8,365,112	135,706
Rubberized automobile cloth, *sq. yd.*	40,409	20,587	79,396	41,727
Other rubberized piece goods and hospital sheeting—*sq. yd.*	68,547	31,076	173,208	59,663
Footwear				
Boots—*pairs*	6,545	16,270	11,929	27,355
Shoes—*pairs*	17,205	9,622	20,445	12,230
Canvas shoes with rubber soles—*pairs*	34,127	17,793	73,468	40,021
Soles—*doz. pairs*	1,875	3,386	3,885	6,480
Heels—*doz. pairs*	31,461	17,422	67,283	40,828
Soling and top lift sheets	26,810	4,123	43,037	6,485
Water bottles and fountain syringes—*number*	14,866	5,913	28,103	10,898
Gloves—*doz. pairs*	3,878	7,974	9,062	19,158
Other druggists' sundries	.....	28,396	.....	53,544
Balloons—*gross*	27,938	23,924	55,061	45,448
Toys and balls	.....	2,752	.....	5,761
Bathing caps—*doz.*	3,581	7,339	7,443	12,194
Bands	19,445	7,414	35,242	12,842
Erasers	30,164	17,097	54,403	31,964
Hard rubber goods				
Electrical goods	103,224	10,182	240,478	23,465
Other goods	.....	14,352	.....	32,642
Tires				
Truck and bus casings, *number*	15,589	283,484	38,854	659,436
Other automobile casings, *number*	60,752	534,744	131,061	1,079,356
Tubes, auto—*number*	53,352	74,237	116,926	152,171
Other casings and tubes, *number*	3,066	7,558	7,964	19,265
Solid tires for automobiles and motor trucks, *number*	361	9,507	1,062	30,542
Other solid tires	147,279	20,056	262,837	35,380
Tire sundries and repair materials	.....	31,523	.....	60,071
Rubber and friction tape	38,976	10,797	92,359	25,371
Belting	154,303	71,360	326,396	164,537
Hose	339,896	102,099	639,574	184,787
Packing	115,275	35,575	242,357	79,647
Thread	97,511	63,069	191,519	121,601
Other rubber manufactures	.....	146,622	.....	296,708
Totals	.....	$1,771,130	.....	$3,643,466

Rubber Goods Production Statistics

		1935	1934
TIRES AND TUBES*		Feb.	Feb.
Pneumatic casings			
Production	*thousands*	4,251	4,205
Shipments, total	*thousands*	3,189	3,186
Domestic	*thousands*	3,112	3,106
Stocks, end of month	*thousands*	11,184	10,403
Solid and cushion tires			
Production	*thousands*	18	12
Shipments, total	*thousands*	16	13
Domestic	*thousands*	16	12
Stocks, end of month	*thousands*	32	28
Inner tubes			
Production	*thousands*	4,046	3,956
Shipments, total	*thousands*	3,261	3,224
Domestic	*thousands*	3,200	3,164
Stocks, end of month	*thousands*	10,152	8,892
Raw material consumed			
Fabrics	*thous. of lbs.*	18,059	18,721
MISCELLANEOUS PRODUCTS			
Rubber bands, shipments	*thous. of lbs.*	228	220
Rubber clothing, calendered			
Orders, net	*no. of coats and sundries*	†	15,246
Production	*no. of coats and sundries*	†	20,062
Rubber-proofed fabrics, production, total	*thous. of yds.*	....	3,194
Auto fabrics	*thous. of yds.*	287	301
Raincoat fabrics	*thous. of yds.*	....	1,429
Rubber flooring, shipments	*thous. of sq. ft.*	286	424
Rubber and canvas footwear			
Production, total	*thous. of prs.*	5,383	5,430
Tennis	*thous. of prs.*	3,083	3,580
Waterproof	*thous. of prs.*	2,300	1,850
Shipments, total	*thous. of prs.*	4,752	4,585
Tennis	*thous. of prs.*	3,284	3,241
Waterproof	*thous. of prs.*	1,468	1,345
Shipments, domestic, total	*thous. of prs.*	4,619	4,555
Tennis	*thous. of prs.*	3,165	3,220
Waterproof	*thous. of prs.*	1,454	1,335
Stocks, total, end of month	*thous. of prs.*	15,087	16,394
Tennis	*thous. of prs.*	6,690	8,165
Waterproof	*thous. of prs.*	8,397	8,229
Rubber heels			
Production	*thous. of prs.*	16,334	16,293
Shipments, total	*thous. of prs.*	15,260	20,544
Export	*thous. of prs.*	221	175
Repair trade	*thous. of prs.*	4,777	9,273
Shoe manufactures	*thous. of prs.*	10,262	11,096
Stocks, end of month	*thous. of prs.*	36,950	38,986
Rubber soles			
Production	*thous. of prs.*	3,243	5,711
Shipments, total	*thous. of prs.*	3,601	5,804
Export	*thous. of prs.*	7	1
Repair trade	*thous. of prs.*	704	617
Shoe manufactures	*thous. of prs.*	2,890	5,186
Stocks, end of month	*thous. of prs.*	3,948	5,010
Mechanical rubber goods, shipments			
Total	*thous. of dollars*	4,261	3,491
Belting	*thous. of dollars*	775	757
Hose	*thous. of dollars*	1,372	1,147
Other	*thous. of dollars*	2,115	1,587

*Data for 1934 are estimated to represent approximately 97% of the industry. †Discontinued.

Source: *Survey of Current Business,* Bureau of Foreign & Domestic Commerce, Washington, D. C.

Imports by Customs Districts

	March, 1935		March, 1934	
	*Crude Rubber		*Crude Rubber	
	Pounds	Value	Pounds	Value
Massachusetts	6,079,754	$695,946	7,800,190	$631,631
New York	91,313,949	10,636,636	74,672,796	5,529,301
Philadelphia	1,647,727	203,719	2,719,825	193,960
Maryland	375,275	45,287	3,669,680	232,741
Virginia	700,000	75,000	.....	.....
New Orleans	727,104	74,698	.....	.....
Los Angeles	3,043,441	371,498	4,961,469	363,872
San Francisco	100,700	11,261	585,000	52,468
Michigan	485,580	41,761	.....	.....
Oregon	.....	.....	44,800	4,011
Washington	.....	.....	11,200	975
Ohio	.....	.....	69,078	5,469
Colorado	.....	.....	112,000	8,290
Totals	104,473,530	$12,155,806	94,646,038	$7,022,718

*Crude rubber including latex dry rubber content.

London Stocks, March, 1935

			Stocks, March 31		
LONDON	Landed Tons	Delivered Tons	1935 Tons	1934 Tons	1933 Tons
Plantation	8,902	3,853	92,576	40,477	40,635
Other grades	23	13	88	24	54
LIVERPOOL					
Plantation	*2,806	*1,571	*69,218	*53,813	*53,876
Total tons, London and Liverpool	11,731	5,437	161,882	94,314	94,565

*Official returns from the recognized public warehouses.

Foreign Trade Information

For further information concerning the inquiries listed below address United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Room 734, Custom House, New York, N. Y.

No.	COMMODITY	CITY AND COUNTRY
†8,793	Rubber soled canvas shoe machinery	Johannesburg, South Africa
†8,808	Boots, shoes, heels, soles, transmission belting, water bottles, gloves, toys, hospital sheeting, and druggists' sundries	Brussels, Belgium
†8,825	Printing roller coverings	Lima, Peru
*8,908	Druggists' sundries	Montreal, Canada
†8,909	Tires	Durban, South Africa

*Purchase. †Agency.